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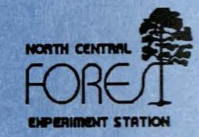
Empirical Yield Tables for Wisconsin

Jerold T. Hahn and Joan M. Stelman

White pine
Red pine
Jack pine
White spruce
Black spruce
Balsam fir
Hemlock
Tamarack
Northern white-cedar
White oak
Red oak
Hickory
Yellow birch
Hard maple
Soft maple
Beech
Ash
Balsam poplar
Cottonwood
Bigtooth aspen
Quaking aspen
Basswood
Yellow-poplar
Black walnut
Black cherry
Butternut
Elm
Paper birch

Our job at the North Central Forest Experiment Station is discovering and creating new knowledge and technology in the field of natural resources and conveying this information to the people who can use it. As a new generation of forests emerges in our region, managers are confronted with two unique challenges: (1) Dealing with the great diversity in composition, quality, and ownership of the forests, and (2) Reconciling the conflicting demands of the people who use them. Helping the forest manager meet these challenges while protecting the environment is what research at North Central is all about.



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Empirical Yield Tables for Wisconsin

Jerold T. Hahn and Joan M. Stelman

Empirical yield tables are useful to managers of timber, wildlife, and other forest resources who are interested in estimating current commercial forest species composition and volume or in making rough, short-term (20-30 years) projections of future conditions. This paper provides empirical yield tables for Wisconsin and demonstrates some uses for them. If you are interested in comparing conditions in the Lake States, similar sets of tables are presented in "Empirical yield tables for Michigan" (Hahn and Stelman 1984) and "Empirical yield tables for Minnesota" (Hahn and Raile 1982). In addition, unpublished empirical yield tables for Missouri (1972) and Iowa (1974) are available at cost from the Forest Inventory and Analysis Research Work Unit at the North Central Forest Experiment Station.

We compiled yield tables for Wisconsin from data gathered on 6,999 timberland plots established during the 1983 inventory of Wisconsin's five Forest Survey Units (fig.1)[1]. The tables give the estimated merchantable cubic foot volume yield per acre from growing-stock trees and the average basal area per acre of all live trees 1 inch diameter breast height (d.b.h.) and larger by stand-age class for the 14 forest types defined in the Appendix. In addition to the net cubic foot volume tables, we present tables showing data generated from a 30-year projection of the base year data and total green weight of above-ground biomass for all live trees. These tables provide a detailed picture of stand composition as measured by growing-stock volume or above-ground biomass.

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We constructed the tables by classifying the timberland plots by forest type, stand-age class, and site-index class. Then the per acre merchantable cubic foot volume or the total above-ground biomass was tabulated by species group. The merchantable volume standards used are minimum 5-inch d.b.h. to a 4-inch top diameter outside bark (top d.o.b.) with a 1-foot stump. We computed individual tree volumes using a formula developed from "Composite volume tables for timber and their application in the Lake States" (Gevorkiantz and Olsen 1955) as described by Hahn (1984) and Smith (1985).

The 30-year projections were made using the STEMS growth projection system (Belcher *et al.* 1982) without management, following methods described in Ek *et al.* (1985, 1987). The 30-year projection provided additional plot volumes at three 10-year intervals. Therefore, in the projection tables, an average 75 percent of the data in a stand-age class is from projected data. This procedure allowed us to smooth out some of the abrupt changes in volumes common to empirical yield tables and to provide estimates for age classes not represented in the initial sample.

In this report, we present tables by forest type and site-index class for the entire State and for each Forest Survey Unit. State total tables for all sites are printed. State total tables by site-index class and Survey Unit tables are included as microfiche inside the back cover. We have included only tables having sufficient data, usually 3 or 4 plots, in each of three adjacent age classes. We feel that information based on smaller samples would not be useful.

[1] *A full explanation of the survey procedures and definitions can be obtained from "Wisconsin's fourth forest inventory, 1983" (Spencer* et al. *1988).*

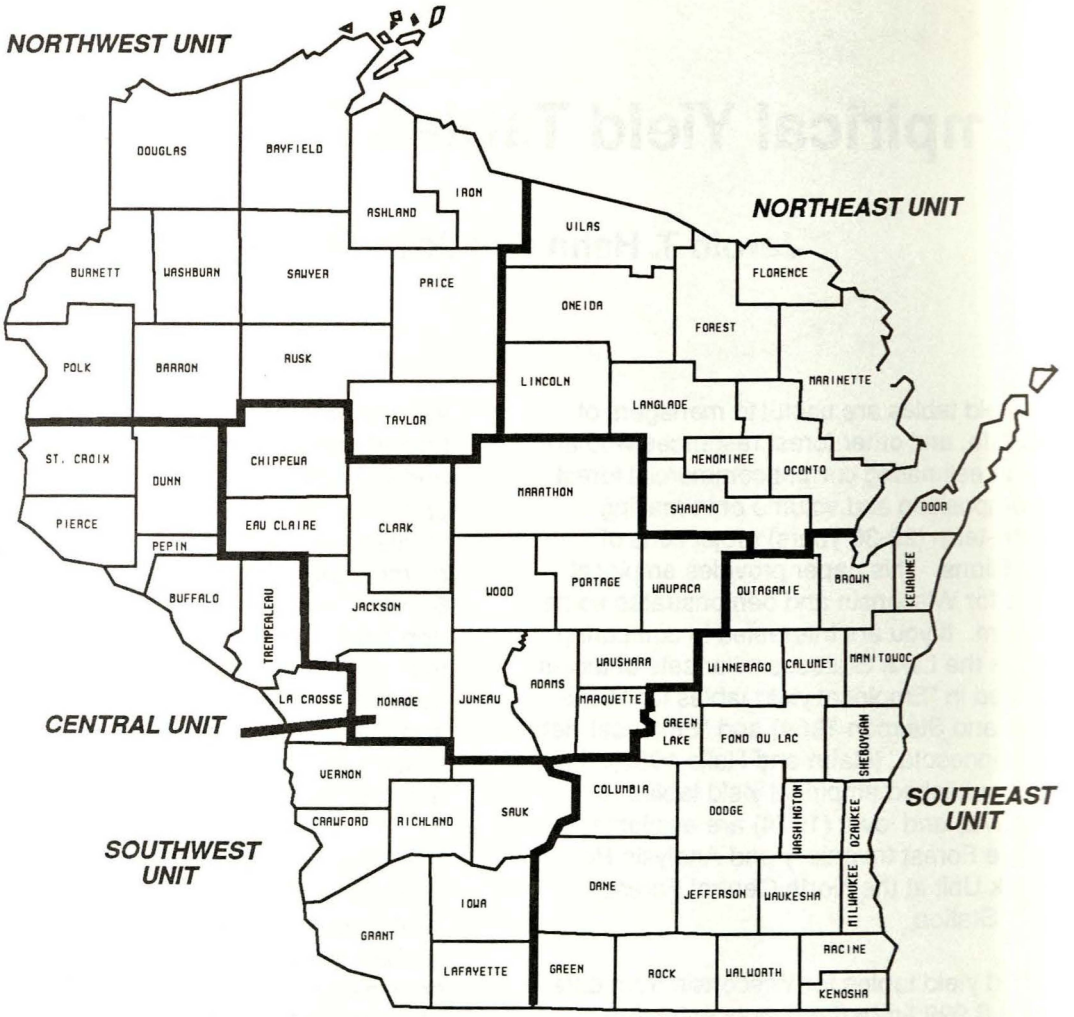

Figure 1.--*Wisconsin's Forest Survey Units.*

The tables can be used in several ways. For example, they can be used to estimate future timber yield in the same manner as normal yield tables—it is assumed that the volume shown in one age class will increase in 10 years to the volume shown in the next older age class. For example, red pine stands aged 61-70 years currently average 1,904 cubic feet per acre (table 2). If you have a stand of red pine 51-60 years old, you could expect that in 10 years the stand would yield approximately 1,904 cubic feet per acre. If users understand and accept the assumptions and accuracy of the growth processor, the same analysis can be made using table 15 (for all sites of red pine) where the expected yield would be 4,030 cubic feet per acre. However, we caution users that it would be much better to use the projection tables by site-index class from the microfiche.

Rotation age (Years)	Area harvested/ year[2]		Merchantable volume/ acre[3]		Annual harvest volume
	Thousand acres		*Cubic feet*		*Million cubic feet*
35	93.2	X	1,042	=	97.1
45	72.5	X	1,256	=	91.1
55	59.3	X	1,381	=	81.9

As a second example, these tables can be used in conjunction with other published forest inventory data to compare volume estimates for progressive rotation ages. For instance, the aspen type occupied 3,261,500 acres in Wisconsin in 1983 (Spencer *et al.* 1988). Assuming that you would harvest an equal number of acres each year, estimates of the annual harvest volume can be derived using the yields shown in table 12.

These harvest volumes can also be broken down by species group. (See Appendix for a detailed breakdown of the species groups.) By using table 12, the annual harvest volume is further broken down into softwoods and hardwoods.

According to this analysis, the greatest total yield and the greatest softwood yield would be attained by using a 35-year rotation for the aspen type. However, more acres would have to be harvested each year to obtain that volume. Currently, more than 40 percent of the plots in the aspen type are in stands older than 35 years. Therefore, considerable volume from older plots would have to be harvested to reach a 35-year rotation.

Rotation age (Years)	Harvest volume		
	Total	Softwoods	Hardwoods
	- - - - - *Million cubic feet* - - - - -		
35	97.1	9.5[4]	87.6
45	91.1	7.1	84.0
55	81.9	9.2	72.7

[2] *Total type acreage (3,261,500 acres)/rotation age (35 years).*

[3] *From table 12.*

Finally, tables by basal area allow a comparison between stand density and stand age that can be used with other inventory data to determine the stocking of existing stands. For example, in 1983 there were 404.9 thousand acres of aspen 51-60 years old in Wisconsin (Spencer *et al.* 1988). Yields in these stands (all species) averaged 97 square feet per acre (table 12). Thus, the ratio of volume to basal area was 14.2 to 1. Schlaegel (1971) predicted that such a ratio for fully stocked stands of aspen in Minnesota would be 26 to 1. If we view Schlaegel's prediction as an index of stand potential, we can estimate that fully stocked aspen sites should yield roughly twice what the stands in the example are producing now. The comparison is approximate because Schlaegel used different standards of merchantability in computing his volume.

The volumes shown in these tables were obtained from plots located in stands with various histories, from undisturbed stands to those that had been repeatedly cut. Thus, the standard errors of mean volume given in the tables indicate their variation. Sampling error in percent can be determined by dividing the standard error by the mean volume of all species. For example, the sampling error for jack pine in the 41-50 year age class for all sites combined (table 1) is 33.5 percent (410/1,225) X 100.

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[4] *Cubic feet/acre of softwoods or hardwoods in the forest type of interest (102 cubic feet) X number of acres in the forest type (93,200 acres).*

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APPENDIX

Definition of Terms

Basal area.—The area in square feet of the cross section at breast height of a single tree. When the basal areas of all live trees in a stand are summed, the result is usually expressed as square feet of basal area per acre.

Biomass.—The total above-ground weight, excluding foliage, of all live trees reported in green tons. Biomass is made up of 5 components:

Growing-stock stumps.—Biomass of a growing-stock tree 1-foot stump.

Growing-stock bole.—Biomass of a growing-stock tree from a 1-foot stump to a variable 4-inch top.

Growing-stock top and limbs.—Biomass of a growing-stock tree from a 1-foot stump minus the growing-stock bole.

Cull stumps.—Biomass of a cull tree 1-foot stump.

Cull bole.—Biomass of a cull tree from a 1-foot stump to a variable 4-inch top.

Cull top and limbs.—Biomass of a cull tree from a 1-foot stump minus the cull bole.

1- to 5-inch trees.—Above-ground biomass of all live trees 1- to 5-inches in diameter at breast height.

Forest type.—A classification of forest land based upon the species forming a plurality of live tree stocking. Major forest types in Wisconsin are:

Jack pine.—Forests in which jack pine comprises a plurality of the stocking. (Common associates include eastern white pine, red pine, aspen, birch, and oak.)

Red pine.—Forests in which red pine comprises a plurality of the stocking. (Common associates include eastern white pine, jack pine, aspen, birch, and oak.)

White pine.—Forests in which eastern white pine comprises a plurality of the stocking. (Common associates include red pine, jack pine, aspen, birch, and maple.)

Balsam fir.—Forests in which balsam fir and white spruce comprise a plurality of stocking with balsam fir the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

White spruce.—Forests in which white spruce and balsam fir comprise a plurality of the stocking with white spruce the most common. (Common associates include aspen, maple, birch, northern white-cedar, and tamarack.)

Black spruce.—Forests in which swamp conifers comprise a plurality of the stocking with black spruce the most common. (Common associates include balsam fir, tamarack, and northern white-cedar.)

Northern white-cedar.—Forests in which swamp conifers comprise a plurality of the stocking with northern white-cedar the most common. (Common associates include balsam fir, tamarack, and black spruce.)

Tamarack.—Forests in which swamp conifers comprise a plurality of the stocking with tamarack the most common. (Common associates include black spruce, balsam fir, and northern white-cedar.)

Oak-hickory.—Forests in which northern red oak, white oak, bur oak, or hickories, singly or in combination, comprise a plurality of the stocking. (Common associates include jack pine, elm, and maple.)

Elm-ash-soft maple.—Forests in which lowland elm, ash, cottonwood, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include birch, aspen, and balsam fir.)

Maple-birch.—Forests in which sugar maple, basswood, yellow birch, upland American elm, and red maple, singly or in combination, comprise a plurality of the stocking. (Common associates include white pine, elm, hemlock, and basswood.)

Aspen.—Forests in which quaking aspen or bigtooth aspen, singly or in combination, comprise a plurality of the stocking. (Common associates include oak, pines, balsam fir, and paper birch.)

Paper birch.—Forests in which paper birch comprise a plurality of the stocking. (Common associates include maple, aspen, and balsam fir.)

Exotic.—Forests in which species not native to Wisconsin comprise a plurality of the stocking. (Mostly Scotch pine plantations.)

Growing-stock trees.—Live trees of commercial species that meet specified standards of size, quality, and merchantability. (Note: Excludes rough and rotten trees.)

Growing-stock volume.—Net volume in cubic feet of growing-stock trees 5 inches d.b.h. and over, from a 1-foot stump to a minimum 4 inch top diameter outside bark of the central stem or to the point where the central stem breaks into limbs. Cubic feet can be converted to cords by dividing by 79 cubic feet per solid wood cord (rough standard cord excluding bark and air spaces).

Live trees.—Growing-stock, rough, and rotten trees 1-inch d.b.h. and larger.

Rotten trees.—Live trees of commercial species that do not contain at least one 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of rot; that is, when more than 50 percent of the cull volume in a tree is rotten.

Rough trees.—(a) Live trees of commercial species that do not contain at least one merchantable 12-foot saw log or two saw logs 8 feet or longer, now or prospectively, and/or do not meet regional specifications for freedom from defect primarily because of roughness or poor form, and (b) all live trees of noncommercial species.

Site index.—An expression of forest site quality based on the height of a free-growing dominant or codominant tree of a representative species in the forest type at age 50.

Stand age.—Age of the main stand. Main stand refers to trees of the dominant forest type and stand-size class.

Stocking.—The degree of occupancy of land by trees, measured by basal area and/or the number of trees in a stand by size or age and spacing, compared to the basal area and/or number of trees required to fully utilize the growth potential of the land; that is, the stocking standard.

A stocking percent of 100 indicates full utilization of the site and is equivalent to 80 square feet of basal area per acre in trees 5 inches d.b.h. and larger. In a stand of trees less than 5 inches d.b.h., a stocking percent of 100 would indicate that the present number of trees is sufficient to produce 80 square feet of basal area per acre when the trees reach 5 inches d.b.h.

Stands are grouped into the following stocking classes:

Overstocked stands.—Stands in which stocking of trees is 130.0 percent or more.

Fully stocked stands.—Stands in which stocking of trees is from 100.0 to 129.9 percent.

Medium stocked stands.—Stands in which stocking of trees is from 60.0 to 99.9 percent.

Poorly stocked stands.—Stands in which stocking of trees is from 16.7 to 59.9 percent.

Nonstocked areas.—Timberland on which stocking of trees is less than 16.7 percent.

Timberland.—(This is a new term universally used in Forest Inventory and Analysis reports and is exactly equivalent to the term "commercial forest land" previously used.) Forest land producing or capable of producing crops of industrial wood and not withdrawn from timber utilization. (Note: Areas qualifying as timberland have the capability of producing in excess of 20 cubic feet per acre per year of annual growth under management. Currently inaccessible and inoperable areas are included, except when the areas involved are small and unlikely to become suitable for production of industrial wood in the foreseeable future.)

Tree Species Groups in Wisconsin[5]

SOFTWOODS
- Jack pine ..... *Pinus banksiana*
- Red pine ..... *Pinus resinosa*
- Eastern white pine ..... *Pinus strobus*
- White spruce ..... *Picea glauca*
- Black spruce ..... *Picea mariana*
- Balsam fir ..... *Abies balsamea*
- Eastern hemlock ..... *Tsuga canadensis*
- Tamarack ..... *Larix laricina*
- Eastern redcedar ..... *Juniperus virginiana*
- Northern white-cedar ..... *Thuja occidentalis*
- Other softwoods
  - Norway spruce ..... *Picea abies*
  - Scotch pine ..... *Pinus sylvestris*

HARDWOODS
- White oak
  - White oak ..... *Quercus alba*
  - Swamp white oak ..... *Quercus bicolor*
  - Bur oak ..... *Quercus macrocarpa*
- Select red oak
  - Northern red oak ..... *Quercus rubra*
- Other red oak
  - Northern pin oak ..... *Quercus ellipsoidalis*
  - Black oak ..... *Quercus velutina*
- Select hickory
  - Shagbark hickory ..... *Carya ovata*
- Other hickory
  - Pignut hickory ..... *Carya glabra*
  - Bitternut hickory ..... *Carya cordiformis*
- American basswood ..... *Tilia americana*
- Beech ..... *Fagus grandifolia*
- Yellow birch ..... *Betula alleghaniensis*
- Hard maple
  - Sugar maple ..... *Acer saccharum*
  - Black maple ..... *Acer nigrum*
- Soft maple
  - Red maple ..... *Acer rubrum*
  - Silver maple ..... *Acer saccharinum*
- Elm
  - American elm ..... *Ulmus americana*
  - Slippery elm ..... *Ulmus rubra*
  - Rock elm ..... *Ulmus thomasii*
- Black ash ..... *Fraxinus nigra*
- White and green ash
  - White ash ..... *Fraxinus americana*
  - Green ash ..... *Fraxinus pennsylvanica*
- Eastern cottonwood ..... *Populus deltoides*
- Black willow ..... *Salix nigra*
- Hackberry ..... *Celtis occidentalis*
- Balsam poplar ..... *Populus balsamifera*
- Bigtooth aspen ..... *Populus grandidentata*
- Quaking aspen ..... *Populus tremuloides*
- Paper birch ..... *Betula papyrifera*
- River birch ..... *Betula nigra*
- Black cherry ..... *Prunus serotina*
- Black walnut ..... *Juglans nigra*
- Butternut ..... *Juglans cinerea*
- Other hardwoods
  - Boxelder ..... *Acer negundo*
  - Black locust ..... *Robinia pseudoacacia*
  - Honeylocust ..... *Gleditsia triacanthos*
  - Red mulberry ..... *Morus rubra*
  - Northern catalpa ..... *Catalpa speciosa*
- Noncommercial species
  - Mountain maple ..... *Acer spicatum*
  - Eastern hophornbeam ..... *Ostrya virginiana*
  - Peachleaf willow ..... *Salix amygdaloides*
  - American hornbeam ..... *Carpinus caroliniana*
  - Hawthorn ..... *Crataegus* spp.
  - Striped maple ..... *Acer pensylvanicum*
  - Mountain-ash ..... *Sorbus* spp.
  - Pin cherry ..... *Prunus pensylvanica*
  - Chokecherry ..... *Prunus virginiana*

[5] *The common and scientific names are based on: Little, Elbert L. 1979. Checklist of United States trees (native and naturalized). Agric. Handb. 541. Washington, DC: U.S. Department of Agriculture, Forest Service. 375 p.*

Table 1.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Jack pine All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	15	0	2	1	10	8	70	20	85	152	0	0	0
Red pine	47	23	17	27	22	62	59	300	293	498	0	0	0
Jack pine	658	133	230	502	862	860	1,002	658	1,091	772	0	0	0
White spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Black spruce	0	0	2	0	0	0	3	0	0	0	0	0	0
Balsam fir	0	0	0	0	0	0	0	0	0	44	0	0	0
Hemlock	0	0	0	0	0	0	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	19	0	0	0	0
Total softwoods	720	156	251	530	894	930	1,134	978	1,488	1,466	0	0	0
Hardwoods													
Select white oak	1	2	0	1	3	3	0	0	0	0	0	0	0
Select red oak	7	0	1	0	17	10	0	0	40	63	0	0	0
Other red oak	24	3	8	12	15	57	24	15	97	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard maple	0	0	0	0	0	0	0	0	0	0	0	0	0
Soft maple	0	0	1	0	2	1	0	0	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	1	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	6	2	12	0	0	6	21	0	0	0	0	0	0
Quaking aspen	35	3	2	13	78	38	46	47	22	78	0	0	0
Basswood	0	0	0	0	0	1	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	2	0	0	0	0	0	0	0	0
Paper birch	4	0	1	3	3	7	0	0	53	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	77	10	26	29	120	123	91	62	212	141	0	0	0
Total all species	797	166	277	559	1,014	1,053	1,225	1,040	1,700	1,607	0	0	0
Number of plots	261	19	47	38	59	59	28	5	5	1	0	0	0
Standard error	140	94	174	235	345	423	410	672	1,368	3/	0	0	0
Average basal area	71	22	48	67	84	84	85	69	110	80	0	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 2.--Cubic foot volume per acre in growing-stock trees by species[1/] group and stand-age class, All Units, Wisconsin, 1983

Forest type - Red pine All sites

(In cubic feet per acre)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	93	2	17	29	55	221	216	123	604	487	376	638	0
Red pine	1,242	66	578	1,764	1,790	1,599	1,496	1,212	1,290	1,651	1,302	1,175	0
Jack pine	55	2	7	65	90	123	114	100	76	0	46	0	0
White spruce	7	6	0	5	1	0	0	28	0	92	46	129	0
Black spruce	4	0	0	7	0	0	13	57	35	0	0	39	0
Balsam fir	9	0	0	1	12	0	0	141	25	28	77	68	0
Hemlock	2	0	0	0	0	0	0	0	43	0	63	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	1	0	0	0	0	0	0	0	0	61	21	0	0
Other softwoods	3	0	7	1	0	0	32	0	0	0	0	0	0
Total softwoods	1,416	76	609	1,872	1,948	1,943	1,871	1,661	2,073	2,319	1,931	2,049	0
Hardwoods													
Select white oak	0	0	2	1	0	0	0	0	0	0	0	0	0
Select red oak	14	2	6	0	9	0	146	0	36	94	29	37	0
Other red oak	13	0	27	20	10	0	9	0	0	0	12	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	12	0	0
Hard maple	6	0	7	0	15	3	0	0	35	31	10	28	0
Soft maple	9	0	3	0	2	51	0	0	42	66	20	171	0
Beech	0	0	3	0	0	0	0	0	0	0	0	0	0
Ash	1	0	5	0	0	4	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	8	0	1	3	16	0	0	59	58	45	24	43	0
Quaking aspen	42	0	27	10	101	59	0	131	205	70	23	36	0
Basswood	0	0	1	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	3	0	1	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	6	0	0	0	0	8	0	0
Paper birch	13	14	4	3	6	0	48	53	0	101	58	205	0
Other hardwoods	1	0	1	0	4	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	107	19	87	38	163	123	203	243	376	407	196	520	0
Total all species	1,523	95	696	1,910	2,111	2,066	2,074	1,904	2,449	2,726	2,127	2,569	0
Number of plots	211	24	47	51	40	17	11	4	5	4	6	2	0
Standard error	289	76	275	830	843	1,201	947	1,461	1,624	2,451	971	3/	0
Average basal area	100	9	65	127	130	127	124	116	138	145	115	128	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 3.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - White pine All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	939	208	380	456	460	968	608	888	1,399	1,096	758	1,283	2,014
Red pine	183	73	146	220	236	258	168	292	250	110	143	201	85
Jack pine	52	0	0	58	61	81	105	120	58	26	0	67	0
White spruce	20	12	0	23	0	0	0	14	101	24	0	16	0
Black spruce	17	0	0	65	0	19	31	0	23	31	0	0	15
Balsam fir	33	0	0	0	0	0	8	11	86	84	0	16	81
Hemlock	13	0	0	0	0	28	0	0	23	5	0	19	57
Tamarack	5	0	0	0	0	0	29	0	0	11	0	0	6
Northern white-cedar	9	0	0	0	0	0	0	0	0	4	0	13	87
Other softwoods	1	0	0	0	0	0	11	0	0	0	0	0	0
Total softwoods	1,272	293	526	822	757	1,354	960	1,325	1,940	1,391	901	1,615	2,345
Hardwoods													
Select white oak	13	0	0	0	5	17	25	14	16	18	0	13	19
Select red oak	15	0	0	0	0	0	7	22	27	5	78	0	66
Other red oak	27	0	0	0	10	28	14	110	32	26	0	106	0
Hickory	1	0	0	0	16	0	0	0	0	0	0	0	0
Yellow birch	1	0	20	0	0	0	0	0	0	0	0	0	0
Hard maple	7	0	20	0	0	0	0	0	0	0	0	95	17
Soft maple	49	0	8	0	7	5	27	84	74	44	82	119	147
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	5	0	0	0	0	0	0	0	4	10	0	72	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	22	0	0	399	0	0	0	0	8	0	0	0	0
Bigtooth aspen	16	0	0	19	0	9	16	8	82	9	0	0	0
Quaking aspen	118	22	63	91	159	146	153	151	131	156	0	169	48
Basswood	4	0	0	0	0	0	12	0	0	5	0	0	20
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	4	0	18	0	8	0	0	0	0	0	0	63	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	2	0	7	0	0	9	6	0	0	2	0	0	0
Paper birch	44	0	0	0	23	59	44	0	94	68	0	45	88
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	328	22	136	509	228	273	304	389	468	343	160	682	405
Total all species	1,600	315	662	1,331	985	1,627	1,264	1,714	2,408	1,734	1,061	2,297	2,750
Number of plots	113	9	8	6	9	11	12	10	15	15	2	5	11
Standard error	282	179	335	802	530	716	552	896	1,393	689	3/	1,586	1,430
Average basal area	100	28	86	96	83	110	100	117	121	106	73	120	124

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 4.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Black spruce All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	15	0	6	10	18	16	4	0	102	44	51	0	0
Red pine	16	8	20	12	14	4	29	0	89	0	0	0	0
Jack pine	1	0	0	0	0	0	15	0	0	16	0	0	0
White spruce	3	0	0	1	0	3	0	0	48	0	0	0	0
Black spruce	200	59	74	61	152	365	253	524	444	988	240	0	88
Balsam fir	31	17	9	11	12	40	69	74	147	55	63	0	0
Hemlock	9	0	6	0	0	0	0	0	38	81	254	0	0
Tamarack	48	44	38	34	27	32	124	101	53	129	0	0	127
Northern white-cedar	16	0	20	0	0	27	14	34	66	22	199	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	339	128	173	129	223	487	508	733	987	1,335	807	0	215
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	4	0	2	9	0	11	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	7	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	1	0	0	2	0	0	8	0	8	0	0	0	0
Hard maple	0	0	0	1	0	0	0	0	8	0	0	0	0
Soft maple	7	0	2	4	0	14	28	8	34	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	14	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	4	0	0	12	2	0	0	0	8	0	0	0	0
Quaking aspen	43	41	25	45	33	70	103	17	59	0	0	0	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	40	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper birch	15	0	11	15	19	30	17	20	29	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	74	41	40	88	54	125	156	59	153	0	40	0	0
Total all species	413	169	213	217	277	612	664	792	1,140	1,335	847	0	215
Number of plots	142	16	23	38	18	16	8	8	7	5	2	0	1
Standard error	84	115	128	147	186	318	399	474	781	907	3/	0	3/
Average basal area	60	30	46	48	65	86	76	69	106	120	63	0	15

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 5.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Balsam fir All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	31	26	5	10	9	32	39	8	58	13	158	350	50
Red pine	9	5	13	3	0	7	11	3	0	50	53	29	0
Jack pine	1	9	0	0	0	0	0	0	0	0	0	0	0
White spruce	65	14	25	38	93	80	93	41	145	115	74	178	0
Black spruce	42	29	18	6	54	49	46	53	151	0	0	132	0
Balsam fir	445	100	153	220	457	551	681	646	476	541	488	391	192
Hemlock	16	8	0	7	23	9	12	10	32	36	0	0	337
Tamarack	12	3	8	13	0	5	16	15	0	7	0	160	0
Northern white-cedar	91	36	78	60	142	88	78	109	118	186	0	98	506
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	712	230	300	357	778	821	976	885	980	948	773	1,338	1,085
Hardwoods													
Select white oak	0	1	0	0	2	0	0	0	0	0	0	0	0
Select red oak	1	2	4	0	0	4	1	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	6	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	12	1	4	5	0	27	7	20	9	60	0	17	45
Hard maple	6	6	0	13	0	14	9	0	0	7	0	0	0
Soft maple	30	13	16	33	8	37	41	7	43	130	72	36	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	24	24	8	12	13	39	9	70	8	43	0	0	0
Balsam poplar	3	0	0	0	4	0	14	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	3	4	25	0	0	4	2	0	0	0	0	0	15
Quaking aspen	89	23	87	58	65	220	99	71	47	53	89	217	0
Basswood	0	0	0	2	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	5	0	0	0	0	9	20	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	5	0	0	1	5	11	7	12	0	0	0	0	0
Paper birch	50	23	39	33	55	54	63	71	104	35	0	40	16
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	228	97	183	157	152	419	272	251	211	334	161	310	76
Total all species	940	327	483	514	930	1,240	1,248	1,136	1,191	1,282	934	1,648	1,161
Number of plots	213	29	16	24	16	27	49	27	8	8	2	4	3
Standard error	152	157	241	191	400	477	478	503	863	568	3/	936	847
Average basal area	85	33	60	61	93	111	105	94	105	105	68	107	115

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 6.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 1/

Forest type - Northern white-cedar All sites

(In cubic feet per acre)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	27	19	0	0	26	15	20	9	12	12	52	6	83
Red pine	0	0	0	0	0	4	0	0	0	0	0	5	0
Jack pine	1	0	0	0	0	0	0	0	14	0	0	0	0
White spruce	18	0	10	8	0	11	41	29	12	17	11	29	19
Black spruce	45	41	0	28	33	34	41	69	26	65	36	3	91
Balsam fir	109	8	33	33	44	119	120	157	138	87	87	111	147
Hemlock	33	11	0	0	0	3	24	7	5	16	51	16	135
Tamarack	40	0	10	43	17	104	79	48	33	0	49	10	10
Northern white-cedar	789	169	322	289	330	607	806	913	788	651	925	1,191	1,068
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	1,062	248	375	401	450	897	1,131	1,232	1,028	848	1,211	1,371	1,553
Hardwoods													
Select white oak	0	14	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	0	0	6	0	0	0	0	4	0	0	0	0
Other red oak	0	0	0	5	0	0	0	0	4	0	0	0	0
Hickory	1	15	0	0	0	4	0	0	0	0	0	4	0
Yellow birch	26	0	0	0	0	0	29	22	16	23	34	29	76
Hard maple	0	0	0	0	0	0	0	0	0	0	0	4	0
Soft maple	23	0	64	16	72	3	43	22	17	20	26	24	20
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	46	0	0	12	20	11	23	49	81	31	53	86	86
Balsam poplar	3	0	0	0	0	2	0	4	0	0	16	6	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	4	0	0	0	0	0	35	7	0	0	0	0	0
Quaking aspen	31	13	53	0	47	67	50	56	27	21	10	34	4
Basswood	2	12	0	0	0	0	0	0	0	0	15	4	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	6	0	8	0	0	4	8	27	0	5	5	3	2
Paper birch	52	16	54	40	92	61	75	80	42	40	34	75	27
Other hardwoods	0	0	0	0	22	0	0	0	0	0	0	0	2
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	194	70	179	79	253	152	263	267	191	140	193	269	217
Total all species	1,256	318	554	480	703	1,049	1,394	1,499	1,219	988	1,404	1,640	1,770
Number of plots	171	4	7	10	4	20	16	19	15	15	22	14	25
Standard error	320	295	328	292	639	536	706	1,047	1,055	698	1,152	1,395	1,323
Average basal area	130	39	80	92	74	120	123	153	131	116	154	141	158

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 7.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Tamarack All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	26	28	13	9	4	22	19	33	93	31	0	193	0
Red pine	2	0	0	3	0	0	0	9	10	0	0	0	0
Jack pine	1	0	0	2	0	14	0	0	0	0	0	0	0
White spruce	4	7	0	0	0	9	4	8	0	0	0	0	103
Black spruce	34	25	16	32	13	71	73	39	25	33	0	167	0
Balsam fir	24	1	21	16	22	90	9	18	40	49	0	0	0
Hemlock	0	0	0	0	0	0	0	0	0	5	0	0	0
Tamarack	321	174	100	127	492	418	578	689	619	465	0	484	544
Northern white-cedar	7	0	0	0	0	6	18	12	29	32	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	419	235	150	189	531	630	701	808	816	615	0	844	647
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	4	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	2	0	0	0	0	0	4	0	0	0	0
Hard maple	0	0	2	0	0	0	0	0	0	0	0	0	0
Soft maple	15	7	5	22	17	7	35	20	45	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	1	0	0	0	0	0	0	22	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	9	17	0	0	0	84	9	0	0	0	0	0	0
Quaking aspen	20	0	19	8	8	127	0	41	15	0	0	0	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	1	0	0	0	5	15	0	0	0	7	0	0	0
Paper birch	22	36	14	3	28	33	24	59	27	8	0	37	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	68	64	42	33	58	266	68	142	91	15	0	37	0
Total all species	487	299	192	222	589	896	769	950	907	630	0	881	647
Number of plots	119	16	26	22	7	9	9	10	8	8	0	2	2
Standard error	86	141	90	141	320	503	484	460	510	381	0	3/	3/
Average basal area	50	29	28	45	72	70	65	68	79	57	0	71	43

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 8.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - White spruce All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	45	0	57	0	16	0	0	745	0	0	0	0	0
Red pine	12	0	21	16	26	0	0	0	0	0	0	0	0
Jack pine	0	0	0	0	0	0	0	0	0	0	0	0	0
White spruce	1,064	0	282	1,606	2,370	1,150	1,375	1,498	0	0	0	0	0
Black spruce	5	0	0	0	30	0	0	0	0	0	0	0	0
Balsam fir	56	0	12	0	75	150	108	348	0	0	0	0	0
Hemlock	2	0	12	0	0	0	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	16	0	0	0	86	0	0	0	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	1,200	0	384	1,622	2,603	1,300	1,483	2,591	0	0	0	0	0
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	4	0	19	0	0	0	0	0	0	0	0	0	0
Hard maple	11	0	26	0	13	20	0	0	0	0	0	0	0
Soft maple	16	0	0	0	87	0	0	0	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	19	0	0	0	27	94	0	87	0	0	0	0	0
Balsam poplar	6	0	0	0	0	0	87	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	3	0	0	0	0	30	0	0	0	0	0	0	0
Quaking aspen	66	40	68	0	0	200	205	89	0	0	0	0	0
Basswood	2	0	0	0	0	21	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	2	0	10	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	3	0	15	0	0	0	0	0	0	0	0	0	0
Paper birch	9	0	0	0	0	0	0	258	0	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	141	40	138	0	127	365	292	434	0	0	0	0	0
Total all species	1,341	40	522	1,622	2,730	1,665	1,775	3,025	0	0	0	0	0
Number of plots	26	5	6	4	5	3	2	1	0	0	0	0	0
Standard error	531	45	307	1,790	2,382	1,187	3/	3/	0	0	0	0	0
Average basal area	99	7	68	122	168	128	132	152	0	0	0	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 9.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Oak-hickory All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	18	10	5	6	10	7	17	16	50	22	23	6	38
Red pine	9	6	12	4	26	6	7	13	4	35	2	0	0
Jack pine	29	40	33	41	82	39	38	35	15	10	14	4	3
White spruce	0	0	0	4	0	0	0	0	0	0	0	0	0
Black spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam fir	0	0	0	0	6	0	0	2	0	0	0	0	0
Hemlock	0	0	0	2	1	0	0	0	3	0	0	0	0
Tamarack	0	0	0	0	1	0	0	1	0	1	0	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	0	0	1	0	1	0	0	0	0	4	0	0	0
Total softwoods	56	56	51	57	127	52	62	67	72	72	39	10	41
Hardwoods													
Select white oak	160	27	44	77	106	109	122	174	168	287	288	276	321
Select red oak	318	38	66	96	137	318	464	282	456	438	360	529	370
Other red oak	181	81	67	107	222	260	219	272	209	197	153	132	139
Hickory	40	14	13	36	60	52	31	44	40	56	54	56	43
Yellow birch	0	0	0	0	0	0	0	1	2	0	0	0	0
Hard maple	17	2	0	2	11	6	9	16	38	20	34	54	18
Soft maple	39	3	1	8	27	51	62	35	74	35	33	43	40
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	12	0	5	1	7	7	16	11	21	24	14	20	12
Balsam poplar	0	0	0	0	0	0	3	0	0	0	0	0	0
Cottonwood	2	0	2	2	1	2	2	3	0	5	0	1	0
Bigtooth aspen	51	12	7	19	48	74	93	65	73	51	31	35	30
Quaking aspen	31	12	6	45	27	65	63	29	22	16	19	13	13
Basswood	24	2	2	8	11	18	25	19	27	55	26	48	41
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	5	6	0	3	0	1	4	4	6	7	7	4	12
Black cherry	19	3	4	16	28	31	18	14	26	33	9	25	19
Butternut	5	4	0	0	14	9	6	5	0	0	3	11	2
Elm	15	9	2	7	10	13	9	19	17	29	31	24	17
Paper birch	38	7	10	33	60	48	76	69	34	15	38	22	20
Other hardwoods	1	0	1	0	0	0	4	1	0	6	0	2	3
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	958	220	230	460	769	1,064	1,226	1,063	1,213	1,274	1,100	1,295	1,100
Total all species	1,014	276	281	517	896	1,116	1,288	1,130	1,285	1,346	1,139	1,305	1,141
Number of plots	1,199	148	65	41	53	142	177	116	117	90	64	98	88
Standard error	108	116	120	179	308	368	413	344	376	429	366	412	395
Average basal area	85	38	45	63	82	95	100	100	100	98	89	95	95

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 10.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Elm-ash-soft maple All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	18	1	4	11	10	23	24	36	17	38	7	13	30
Red pine	0	1	0	0	0	0	2	0	1	0	0	0	0
Jack pine	1	0	0	0	5	4	2	0	0	0	0	0	0
White spruce	6	1	4	1	9	7	3	13	8	10	9	3	7
Black spruce	2	0	0	1	2	2	6	3	0	1	0	8	3
Balsam fir	45	6	8	30	38	69	52	77	65	33	36	66	68
Hemlock	14	0	4	5	0	5	9	26	22	21	23	68	51
Tamarack	8	3	3	6	17	6	7	15	20	5	0	0	0
Northern white-cedar	40	15	13	18	23	34	15	83	84	48	9	59	109
Other softwoods	0	0	1	0	0	2	0	0	0	0	0	0	0
Total softwoods	134	27	37	72	104	152	120	253	217	156	84	217	268
Hardwoods													
Select white oak	13	9	14	3	16	8	6	8	27	23	28	25	2
Select red oak	13	2	2	1	5	13	21	16	23	19	33	35	3
Other red oak	6	3	5	0	8	9	1	0	33	0	0	3	0
Hickory	0	0	0	0	0	1	0	0	1	2	0	0	0
Yellow birch	15	0	1	17	12	8	20	26	18	21	3	41	55
Hard maple	11	1	6	5	12	9	21	17	14	10	26	20	6
Soft maple	214	37	68	109	194	213	311	246	359	295	317	340	262
Beech	0	0	0	0	0	0	0	0	3	1	0	0	0
Ash	271	59	64	277	305	240	269	331	375	361	558	412	413
Balsam poplar	5	2	1	5	13	7	1	16	2	0	0	3	0
Cottonwood	9	5	6	6	0	27	9	2	6	22	0	0	28
Bigtooth aspen	3	4	4	0	0	9	9	1	1	0	0	0	0
Quaking aspen	48	35	22	47	89	96	75	36	25	10	78	19	0
Basswood	23	4	2	4	4	38	19	24	50	34	36	64	22
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	2	0	0	0	0	0	0	0	0	0	0	0
Black cherry	2	1	1	0	1	7	2	3	0	4	0	0	0
Butternut	0	0	0	0	0	0	0	0	1	0	0	0	0
Elm	73	18	15	59	56	59	65	102	93	114	168	118	187
Paper birch	31	12	19	26	45	36	47	47	33	43	10	21	6
Other hardwoods	23	16	30	7	26	28	46	5	8	68	7	38	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	760	210	260	566	786	808	922	880	1,072	1,027	1,264	1,139	984
Total all species	894	237	297	638	890	960	1,042	1,133	1,289	1,183	1,348	1,356	1,252
Number of plots	606	77	56	40	56	76	59	67	60	42	26	26	21
Standard error	94	91	118	228	300	285	334	366	381	401	551	596	605
Average basal area	75	29	43	60	73	81	83	88	97	93	99	105	99

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 11.--Cubic foot volume per acre in growing-stock trees by species[1/] group and stand-age class, All Units, Wisconsin, 1983

Forest type - Maple-birch All sites

(In cubic feet per acre)

Species group	Average[2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	31	4	18	16	27	17	27	38	40	43	71	26	80
Red pine	4	4	4	2	2	0	5	4	7	0	7	4	13
Jack pine	1	2	4	2	0	0	1	0	6	0	0	0	0
White spruce	5	0	2	2	4	5	6	7	6	4	11	6	3
Black spruce	0	0	0	0	1	1	0	1	0	0	0	3	0
Balsam fir	28	12	19	16	37	37	30	38	29	24	11	27	29
Hemlock	65	3	10	4	15	15	20	29	33	55	115	229	433
Tamarack	1	0	1	0	0	1	1	2	0	0	0	0	2
Northern white-cedar	13	1	2	2	3	5	10	19	11	12	24	32	56
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	148	26	60	44	89	81	100	138	132	138	239	327	616
Hardwoods													
Select white oak	17	10	24	16	19	10	14	13	24	28	31	25	12
Select red oak	69	18	35	49	68	67	90	76	76	107	98	79	60
Other red oak	6	3	13	19	3	2	8	3	6	0	8	2	3
Hickory	11	5	11	12	18	15	11	4	9	14	9	17	11
Yellow birch	41	3	6	4	21	22	28	44	35	68	91	93	141
Hard maple	339	58	52	107	215	303	355	433	479	520	520	513	606
Soft maple	138	43	68	84	158	190	180	183	140	133	159	129	59
Beech	6	1	0	13	1	1	0	5	3	10	2	26	32
Ash	68	15	10	46	58	87	86	99	108	83	66	64	38
Balsam poplar	0	0	0	0	3	1	1	0	2	0	1	0	0
Cottonwood	0	1	2	2	0	0	0	0	0	1	1	5	0
Bigtooth aspen	22	4	8	10	27	32	46	20	39	17	17	8	0
Quaking aspen	70	27	56	95	126	114	101	73	44	38	20	25	7
Basswood	171	20	33	84	126	237	223	269	196	219	155	133	133
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	2	2	0	1	0	2	0	0	1	0
Black cherry	16	8	17	17	27	22	17	13	31	16	12	12	2
Butternut	4	1	5	8	2	1	2	2	7	5	11	5	2
Elm	62	14	24	42	58	58	65	83	91	83	71	71	91
Paper birch	53	11	24	38	55	61	79	80	39	50	75	46	19
Other hardwoods	2	0	1	0	16	0	1	4	3	3	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,095	242	389	648	1,003	1,223	1,308	1,404	1,334	1,395	1,347	1,254	1,216
Total all species	1,243	268	449	692	1,092	1,304	1,408	1,542	1,466	1,533	1,586	1,581	1,832
Number of plots	1,887	156	130	111	113	281	313	234	116	112	73	117	131
Standard error	152	119	142	207	350	447	510	557	519	549	588	505	741
Average basal area	93	34	57	74	89	102	105	110	104	103	103	104	110

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 12.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Aspen All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	14	6	6	5	10	9	29	37	53	114	0	0	0
Red pine	16	11	6	15	10	8	37	32	50	49	0	0	0
Jack pine	13	7	9	14	17	20	9	20	8	13	0	0	0
White spruce	10	5	5	8	10	12	17	13	13	42	0	0	0
Black spruce	3	1	2	2	2	3	6	1	0	0	0	0	0
Balsam fir	33	10	8	23	48	42	45	74	65	65	0	0	0
Hemlock	1	1	0	0	1	0	0	0	13	12	0	0	0
Tamarack	2	1	2	0	2	2	2	0	31	0	0	0	0
Northern white-cedar	4	1	0	1	2	2	10	7	44	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	96	43	38	68	102	98	155	184	277	295	0	0	0
Hardwoods													
Select white oak	8	5	6	6	13	8	8	21	19	9	34	0	0
Select red oak	34	8	12	21	22	45	70	90	20	129	496	0	0
Other red oak	11	7	3	7	8	15	15	9	72	19	201	0	0
Hickory	0	0	0	1	1	0	0	4	0	0	0	0	0
Yellow birch	1	0	0	1	1	0	2	2	2	8	0	0	0
Hard maple	14	8	4	19	9	18	23	23	9	30	0	0	0
Soft maple	59	27	28	33	61	89	86	108	61	150	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	11	5	4	8	20	13	15	21	13	0	0	0	0
Balsam poplar	7	1	2	0	7	6	18	18	13	46	0	0	0
Cottonwood	0	1	0	1	0	0	3	0	0	0	0	0	0
Bigtooth aspen	115	18	19	49	98	188	257	202	240	157	868	0	0
Quaking aspen	392	94	139	321	576	630	536	522	365	552	52	0	0
Basswood	8	2	10	2	8	11	11	10	3	5	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	7	2	4	8	10	11	4	5	11	0	0	0	0
Butternut	0	0	0	0	0	0	1	2	0	0	0	0	0
Elm	6	3	2	6	10	5	9	19	3	3	85	0	0
Paper birch	83	23	26	60	94	119	168	108	93	82	83	0	0
Other hardwoods	0	0	0	0	2	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	756	204	259	543	940	1,158	1,226	1,164	924	1,190	1,819	0	0
Total all species	852	247	297	611	1,042	1,256	1,381	1,348	1,201	1,485	1,819	0	0
Number of plots	1,608	322	223	156	229	337	209	77	35	18	2	0	0
Standard error	125	108	116	219	347	422	470	471	470	660	[3/]	0	0
Average basal area	68	29	43	60	79	92	97	98	83	100	100	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 13.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Paper birch All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	25	19	4	3	42	9	40	42	36	91	0	0	0
Red pine	25	18	3	19	12	11	24	63	160	0	0	0	0
Jack pine	5	0	0	3	10	9	5	0	0	0	0	0	0
White spruce	17	0	0	32	2	15	26	18	5	751	0	44	0
Black spruce	4	7	0	3	0	2	12	4	0	0	0	0	0
Balsam fir	54	4	3	21	37	72	63	99	88	0	279	53	0
Hemlock	6	0	0	3	7	0	5	16	18	0	497	0	0
Tamarack	4	0	19	8	2	1	3	5	9	0	0	0	0
Northern white-cedar	14	0	11	3	12	24	5	17	63	0	0	42	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	154	48	40	95	124	143	183	264	379	842	776	139	0
Hardwoods													
Select white oak	12	13	44	1	22	9	3	11	10	0	0	31	0
Select red oak	85	24	31	30	73	79	138	143	89	0	0	0	0
Other red oak	4	0	0	0	10	5	3	2	32	0	0	0	0
Hickory	3	2	2	10	10	5	0	0	0	0	0	0	0
Yellow birch	4	0	0	7	1	2	7	2	13	0	161	0	0
Hard maple	26	2	4	3	16	20	57	37	49	0	0	0	0
Soft maple	83	18	50	54	47	102	123	102	65	0	610	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	15	0	2	8	27	19	10	19	55	0	0	38	0
Balsam poplar	2	5	0	0	3	1	0	2	0	0	0	84	0
Cottonwood	0	0	0	3	0	0	0	0	0	0	0	0	0
Bigtooth aspen	43	2	16	25	46	32	71	55	148	0	0	0	0
Quaking aspen	131	38	32	124	114	180	160	142	139	67	72	104	0
Basswood	11	0	8	6	9	14	19	5	0	0	0	81	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	4	0	0	2	5	5	5	6	8	0	0	0	0
Butternut	0	0	0	0	3	0	0	0	0	0	0	0	0
Elm	7	5	8	4	17	10	1	4	9	0	0	0	0
Paper birch	563	133	247	307	633	651	672	793	699	142	1,439	214	0
Other hardwoods	0	0	0	0	3	0	0	0	10	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	993	242	444	584	1,039	1,134	1,269	1,323	1,326	209	2,282	552	0
Total all species	1,147	290	484	679	1,163	1,277	1,452	1,587	1,705	1,051	3,058	691	0
Number of plots	322	27	26	29	41	78	68	40	9	1	1	2	0
Standard error	202	125	188	266	384	499	528	822	877	3/	3/	3/	0
Average basal area	88	28	54	69	87	100	103	113	110	56	155	57	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 14.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Jack pine All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	34	0	2	4	9	15	26	42	84	189	127	316	0
Red pine	161	23	25	71	114	179	160	164	271	305	637	629	0
Jack pine	930	133	237	571	870	1,073	1,152	1,113	1,067	968	744	693	0
White spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Black spruce	1	0	1	1	1	1	0	1	0	4	24	57	0
Balsam fir	0	0	0	0	0	0	0	0	0	1	6	35	0
Hemlock	0	0	0	0	0	0	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	3	15	31	0
Total softwoods	1,126	156	265	647	994	1,268	1,338	1,320	1,422	1,470	1,553	1,761	0
Hardwoods													
Select white oak	3	2	1	1	2	2	3	5	6	0	0	0	0
Select red oak	12	0	1	0	7	10	15	25	16	7	35	88	0
Other red oak	32	3	7	11	15	31	36	39	68	44	83	133	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard maple	0	0	0	0	0	0	0	0	0	0	0	0	0
Soft maple	3	0	0	1	1	2	4	7	11	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	10	2	10	7	7	9	9	13	22	10	0	0	0
Quaking aspen	66	3	3	40	75	62	69	100	65	100	84	85	0
Basswood	0	0	0	0	0	0	0	0	2	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	3	12	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	1	1	0	0	0	0	0
Paper birch	8	0	1	2	3	9	7	10	21	9	45	94	0
Other hardwoods	1	0	0	0	0	0	1	2	5	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	135	10	23	62	110	125	145	202	219	182	247	400	0
Total all species	1,261	166	288	709	1,104	1,393	1,483	1,522	1,641	1,652	1,800	2,161	0
Number of plots	1,043	19	66	104	163	202	184	151	97	39	11	7	0
Standard error	111	94	132	229	258	299	293	323	431	465	793	1,245	0
Average basal area	92	22	46	71	92	105	103	98	102	96	101	109	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 15.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Red pine All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	150	2	12	25	43	83	124	229	432	474	575	826	915
Red pine	2,450	66	445	1,461	2,305	3,282	3,810	3,529	2,762	2,426	1,793	1,882	1,773
Jack pine	42	2	6	32	47	51	42	54	76	81	44	29	26
White spruce	20	6	3	11	21	27	9	4	4	23	51	84	225
Black spruce	2	0	0	3	1	1	2	3	7	7	13	10	0
Balsam fir	12	0	0	0	3	5	10	25	22	32	61	62	147
Hemlock	4	0	0	0	0	0	0	0	5	16	47	54	40
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	2	0	0	0	0	0	0	0	0	10	23	45	23
Other softwoods	7	0	4	6	7	9	4	6	15	28	0	0	0
Total softwoods	2,689	76	470	1,538	2,427	3,458	4,001	3,850	3,323	3,097	2,607	2,992	3,149
Hardwoods													
Select white oak	1	0	1	1	1	5	0	0	0	0	0	0	0
Select red oak	14	2	5	4	4	3	17	23	45	100	49	51	8
Other red oak	12	0	17	17	18	16	10	1	3	0	3	2	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	3	6	10
Hard maple	9	0	4	3	3	5	12	25	8	14	27	39	27
Soft maple	19	0	2	1	2	8	19	38	50	34	60	109	227
Beech	0	0	2	1	0	0	0	0	0	0	0	0	0
Ash	1	0	3	2	0	1	0	1	4	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	7	0	1	2	4	3	4	3	13	32	62	56	0
Quaking aspen	48	0	17	18	48	54	58	72	64	77	84	82	47
Basswood	0	0	1	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	1	3	1	1	1	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	1	0	0	0	0	0	1	3	6	0	2	5	7
Paper birch	16	14	9	7	8	5	8	11	24	58	53	101	140
Other hardwoods	2	0	0	5	5	1	1	3	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	131	19	63	62	94	101	130	180	217	315	343	451	466
Total all species	2,820	95	533	1,600	2,521	3,559	4,131	4,030	3,540	3,412	2,950	3,443	3,615
Number of plots	844	24	71	122	162	155	119	72	37	24	19	28	11
Standard error	270	76	187	449	584	795	1,014	1,145	1,247	1,022	960	902	1,152
Average basal area	160	9	50	109	154	204	224	208	182	172	146	161	170

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 16.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - White pine All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,545	208	370	640	871	1,144	1,205	1,416	1,650	1,535	1,822	2,135	2,512
Red pine	296	73	120	208	262	393	396	444	402	319	311	210	173
Jack pine	49	0	0	15	33	72	99	87	83	68	21	19	22
White spruce	38	12	8	34	41	54	9	3	36	54	81	79	5
Black spruce	17	0	0	17	20	35	53	7	8	18	20	17	2
Balsam fir	62	0	0	5	8	12	2	5	33	75	122	160	125
Hemlock	18	0	0	0	0	9	10	11	19	9	15	20	64
Tamarack	5	0	0	0	0	0	9	9	9	6	4	8	6
Northern white-cedar	10	0	0	0	0	0	0	0	0	1	2	7	74
Other softwoods	1	0	0	0	0	0	3	4	5	5	0	0	0
Total softwoods	2,041	293	498	919	1,235	1,719	1,786	1,986	2,245	2,090	2,398	2,655	2,983
Hardwoods													
Select white oak	17	0	0	0	1	7	16	21	25	25	21	23	23
Select red oak	17	0	0	0	0	0	2	8	17	21	22	17	58
Other red oak	31	0	0	10	13	12	15	41	51	48	58	29	32
Hickory	2	0	0	0	4	6	7	8	0	0	0	0	0
Yellow birch	2	0	9	13	6	9	0	0	0	0	0	0	0
Hard maple	10	0	9	8	7	8	0	0	0	0	0	27	39
Soft maple	68	0	3	17	18	13	14	37	62	80	106	106	163
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	5	0	0	0	0	0	0	0	1	4	4	21	10
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	25	0	0	104	84	84	75	0	2	2	4	3	0
Bigtooth aspen	25	0	0	4	6	12	19	14	42	47	64	38	0
Quaking aspen	148	22	48	91	137	189	203	195	177	190	132	149	78
Basswood	4	0	0	0	0	0	4	5	5	8	2	5	13
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	5	0	8	8	20	3	3	3	0	0	0	11	6
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	2	0	3	4	3	3	5	5	2	0	1	0	0
Paper birch	58	0	0	0	6	27	49	54	72	71	66	97	93
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	419	22	80	259	305	373	412	391	456	496	480	526	515
Total all species	2,460	315	578	1,178	1,540	2,092	2,198	2,377	2,701	2,586	2,878	3,181	3,498
Number of plots	452	9	17	23	32	34	38	42	48	52	42	56	59
Standard error	200	179	210	346	369	480	513	540	650	648	844	742	734
Average basal area	138	28	64	99	120	147	140	146	148	139	145	158	155

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 17.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Exotic All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	0	0	0	0	0	0	0	0	0	0	0	0	0
Red pine	770	0	0	292	1,189	1,602	0	0	0	0	0	0	0
Jack pine	0	0	0	0	0	0	0	0	0	0	0	0	0
White spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Black spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam fir	0	0	0	0	0	0	0	0	0	0	0	0	0
Hemlock	0	0	0	0	0	0	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	1,003	0	244	831	1,270	1,667	0	0	0	0	0	0	0
Total softwoods	1,773	0	244	1,123	2,459	3,269	0	0	0	0	0	0	0
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard maple	0	0	0	0	0	0	0	0	0	0	0	0	0
Soft maple	0	0	0	0	0	0	0	0	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	0	0	0	0	0	0	0	0	0	0	0	0	0
Quaking aspen	0	0	0	0	0	0	0	0	0	0	0	0	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total all species	1,773	0	244	1,123	2,459	3,269	0	0	0	0	0	0	0
Number of plots	4	0	1	1	1	1	0	0	0	0	0	0	0
Standard error	1,199	0	3/	3/	3/	3/	0	0	0	0	0	0	0
Average basal area	161	0	72	133	198	244	0	0	0	0	0	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 18.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Black spruce All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	42	0	3	15	33	63	37	49	51	49	73	133	25
Red pine	28	8	17	21	34	39	16	17	32	49	41	50	0
Jack pine	1	0	0	0	0	0	1	3	4	2	4	0	0
White spruce	7	0	0	0	1	3	5	4	16	19	36	51	0
Black spruce	250	59	64	94	141	225	308	392	470	566	449	367	106
Balsam fir	63	17	23	26	38	37	64	75	134	161	163	159	21
Hemlock	11	0	3	2	2	2	0	0	6	25	61	136	120
Tamarack	76	44	53	50	43	57	113	128	109	120	86	60	133
Northern white-cedar	24	0	12	7	9	16	8	23	52	51	87	119	136
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	502	128	175	215	301	442	552	691	874	1,042	1,000	1,075	541
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	5	0	1	5	5	9	5	7	7	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	1	2	3	4	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	1	0	0	1	1	1	2	1	1	0	0	0	0
Hard maple	3	0	0	0	3	5	9	0	1	2	3	4	0
Soft maple	17	0	1	2	7	14	15	30	58	50	25	23	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	1	0	0	0	0	0	0	2	4	4	8	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	5	0	0	5	7	7	10	2	1	0	0	0	0
Quaking aspen	77	41	38	49	81	109	105	100	102	73	10	14	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	3	10	27
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper birch	28	0	6	16	29	44	34	32	39	28	27	10	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	137	41	46	78	133	189	180	174	214	159	79	65	27
Total all species	639	169	221	293	434	631	732	865	1,088	1,201	1,079	1,140	568
Number of plots	568	16	39	77	95	95	80	50	39	28	22	21	6
Standard error	70	115	96	108	141	196	268	256	301	368	366	387	394
Average basal area	69	30	41	52	61	77	76	82	89	99	81	80	39

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 19.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Balsam fir All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	48	26	20	20	21	20	34	42	62	61	36	144	297
Red pine	17	5	9	15	19	31	8	10	15	26	14	39	19
Jack pine	1	9	7	3	1	0	0	0	0	0	0	0	0
White spruce	165	14	30	47	83	121	163	196	246	292	169	270	219
Black spruce	38	29	26	17	19	33	42	51	55	42	41	42	35
Balsam fir	699	100	188	327	494	614	763	875	974	1,008	861	725	493
Hemlock	22	8	7	8	12	11	15	18	19	22	25	40	217
Tamarack	14	3	6	9	9	7	10	12	15	21	17	34	60
Northern white-cedar	135	36	60	79	106	131	115	139	131	163	219	216	382
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	1,139	230	353	525	764	968	1,150	1,343	1,517	1,635	1,382	1,510	1,722
Hardwoods													
Select white oak	0	1	1	1	1	0	0	0	0	0	0	0	0
Select red oak	1	2	1	1	1	3	1	2	1	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	13	1	2	4	7	15	11	12	13	15	26	44	32
Hard maple	11	6	6	10	14	15	18	10	13	10	1	6	0
Soft maple	54	13	18	33	43	48	49	55	58	57	54	185	83
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	37	24	23	22	21	42	31	43	39	51	89	33	0
Balsam poplar	7	0	0	0	0	1	7	12	16	26	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	6	4	13	12	12	14	2	3	4	4	0	0	4
Quaking aspen	135	23	57	82	108	184	155	160	180	124	75	132	228
Basswood	0	0	0	1	1	1	1	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	19	0	7	7	7	6	14	13	49	63	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	7	0	0	0	1	6	9	11	10	7	13	0	9
Paper birch	67	23	40	40	47	59	73	71	81	104	111	62	33
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	357	97	168	213	263	394	371	392	464	461	369	462	389
Total all species	1,496	327	521	738	1,027	1,362	1,521	1,735	1,981	2,096	1,751	1,972	2,111
Number of plots	852	29	45	69	85	83	116	119	111	92	45	35	23
Standard error	117	157	187	200	229	278	293	357	444	562	515	435	502
Average basal area	111	33	54	72	92	114	118	125	135	135	120	128	141

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 20.--Cubic foot volume per acre in growing-stock trees by species[1/] group and stand-age class, All Units, Wisconsin, 1983

Data from a 30-year projection

Forest type - Northern white-cedar All sites

(In cubic feet per acre)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	36	19	16	15	24	10	18	23	25	25	28	39	74
Red pine	1	0	0	0	0	2	2	2	1	0	0	1	2
Jack pine	1	0	0	0	0	0	0	0	3	4	4	3	0
White spruce	37	0	6	8	10	13	33	51	68	67	37	32	29
Black spruce	41	41	38	38	51	33	37	50	45	42	42	28	47
Balsam fir	124	8	26	30	27	77	150	176	188	153	121	115	113
Hemlock	39	11	5	3	4	1	9	13	14	20	25	30	117
Tamarack	33	0	6	24	21	70	69	61	57	34	38	15	9
Northern white-cedar	1,087	169	289	342	515	733	859	953	1,130	1,122	1,160	1,214	1,423
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	1,399	248	386	460	652	939	1,177	1,329	1,531	1,467	1,455	1,477	1,814
Hardwoods													
Select white oak	0	14	6	4	4	0	0	0	0	0	0	0	0
Select red oak	0	0	0	3	2	2	1	0	1	1	1	0	0
Other red oak	0	0	0	2	2	0	0	0	0	1	0	0	0
Hickory	1	15	7	4	4	2	2	2	1	0	0	1	1
Yellow birch	25	0	0	0	0	0	9	16	14	16	23	25	59
Hard maple	0	0	0	0	0	0	0	0	0	0	2	1	1
Soft maple	32	0	70	60	61	49	31	34	19	28	21	30	31
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	44	0	0	6	9	20	31	34	38	51	51	51	63
Balsam poplar	1	0	0	0	0	1	1	1	1	0	5	3	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	4	0	0	0	0	0	11	9	10	14	1	0	0
Quaking aspen	29	13	41	29	41	67	55	55	42	41	15	14	3
Basswood	3	12	9	8	10	0	0	0	0	0	4	7	3
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	6	0	5	5	6	7	3	12	12	8	6	6	3
Paper birch	65	16	41	45	85	103	103	98	86	66	47	52	40
Other hardwoods	0	0	0	0	3	2	2	2	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	210	70	179	166	227	253	249	263	224	226	176	190	204
Total all species	1,609	318	565	626	879	1,192	1,426	1,592	1,755	1,693	1,631	1,667	2,018
Number of plots	684	4	11	21	25	41	50	59	70	65	71	115	152
Standard error	190	295	274	230	294	348	396	478	515	560	620	512	574
Average basal area	150	39	70	94	110	131	139	147	154	155	161	159	168

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 21.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Tamarack All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	60	28	31	41	65	61	30	30	53	67	112	176	102
Red pine	2	0	0	1	1	2	3	2	5	6	10	6	0
Jack pine	5	0	0	0	1	4	12	17	23	0	0	0	0
White spruce	19	7	3	2	9	18	46	17	30	32	11	0	115
Black spruce	67	25	21	36	59	90	112	96	76	71	56	85	57
Balsam fir	53	1	14	18	29	55	67	116	167	47	37	80	0
Hemlock	0	0	0	0	0	0	0	0	0	1	2	6	0
Tamarack	438	174	145	168	255	366	527	682	732	786	810	579	631
Northern white-cedar	14	0	0	0	0	0	5	13	23	39	49	98	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	658	235	214	266	419	596	802	973	1,109	1,049	1,087	1,030	905
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	4	2	1	2	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	1	0	1	1	1	1	3	0	1	1	3	4	0
Hard maple	0	0	1	1	1	2	0	0	0	0	0	0	0
Soft maple	31	7	7	14	25	36	42	32	66	55	45	31	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	6	0	0	0	0	0	0	6	9	13	50	27	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	14	17	9	8	10	11	29	62	23	0	0	0	0
Quaking aspen	33	0	11	14	19	54	54	59	70	25	42	9	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	0	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	2	0	0	0	0	3	5	7	3	1	2	12	0
Paper birch	44	36	27	23	34	28	39	82	121	49	57	29	19
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	131	64	58	62	92	135	172	248	293	144	199	112	19
Total all species	789	299	272	328	511	731	974	1,221	1,402	1,193	1,286	1,142	924
Number of plots	476	16	42	64	71	64	47	35	36	35	26	28	12
Standard error	77	141	89	93	137	226	363	369	419	325	378	343	355
Average basal area	63	29	30	41	52	63	75	86	93	84	84	80	62

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 22.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 1/

Data from a 30-year projection

Forest type - White spruce All sites

(In cubic feet per acre)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	69	0	31	31	32	42	9	81	167	433	1,615	0	0
Red pine	33	0	11	24	39	61	47	39	0	0	0	0	0
Jack pine	0	0	0	0	0	0	0	0	0	0	0	0	0
White spruce	2,105	0	191	1,243	2,431	3,330	3,233	2,168	2,029	1,899	2,692	0	0
Black spruce	3	0	0	0	7	4	6	0	0	0	0	0	0
Balsam fir	71	0	6	6	25	54	91	164	196	357	443	0	0
Hemlock	3	0	6	5	4	5	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	31	0	0	0	21	42	63	106	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	2,315	0	245	1,309	2,559	3,538	3,449	2,558	2,392	2,689	4,750	0	0
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	5	0	10	10	9	5	0	0	0	0	0	0	0
Hard maple	13	0	14	12	7	12	6	29	41	0	0	0	0
Soft maple	19	0	0	0	21	28	41	47	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	16	0	0	0	6	25	26	45	49	0	0	0	0
Balsam poplar	15	0	0	0	0	0	12	25	75	239	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	5	0	0	0	0	5	9	14	34	0	0	0	0
Quaking aspen	52	40	48	51	43	38	61	56	99	47	175	0	0
Basswood	4	0	0	0	0	3	7	11	25	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	0	0	5	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	4	0	8	11	4	5	0	0	0	0	0	0	0
Paper birch	13	0	0	0	0	0	0	23	52	123	421	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	146	40	85	84	90	121	162	250	375	409	596	0	0
Total all species	2,461	40	330	1,393	2,649	3,659	3,611	2,808	2,767	3,098	5,346	0	0
Number of plots	104	5	11	15	20	18	14	11	6	3	1	0	0
Standard error	416	45	166	616	1,012	1,389	1,710	1,125	1,324	2,308	3/	0	0
Average basal area	144	7	47	112	168	202	191	146	143	150	207	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 23.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Oak-hickory All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	36	10	16	26	36	17	16	21	33	46	59	57	46
Red pine	23	6	15	26	40	29	20	28	16	24	32	39	3
Jack pine	41	40	61	73	92	75	60	57	37	31	22	16	6
White spruce	1	0	0	0	1	5	6	0	0	0	0	0	0
Black spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam fir	1	0	0	1	3	1	0	1	0	1	1	0	0
Hemlock	0	0	0	0	0	0	0	0	0	1	1	1	0
Tamarack	0	0	0	0	0	0	0	0	0	0	1	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	0	0	0	1	2	2	0	0	0	1	1	0	0
Total softwoods	102	56	92	127	174	129	102	107	86	104	117	113	55
Hardwoods													
Select white oak	220	27	38	53	81	122	140	173	196	239	293	363	420
Select red oak	420	38	60	86	117	245	392	446	518	573	511	622	536
Other red oak	220	81	90	116	164	235	268	299	292	280	276	205	137
Hickory	55	14	17	31	43	65	55	64	58	56	61	68	65
Yellow birch	0	0	0	0	0	0	0	0	0	0	1	0	0
Hard maple	27	2	2	2	5	6	10	16	24	32	44	56	52
Soft maple	61	3	9	12	21	33	61	72	91	86	76	80	64
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	17	0	2	3	4	7	12	16	22	29	24	27	21
Balsam poplar	0	0	0	0	0	0	1	2	2	2	0	0	0
Cottonwood	2	0	1	1	2	3	3	4	4	3	3	3	1
Bigtooth aspen	76	12	16	23	34	51	85	102	123	127	103	80	39
Quaking aspen	49	12	29	42	56	66	80	77	79	59	33	21	20
Basswood	36	2	6	10	14	17	24	29	34	42	44	61	63
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	7	6	6	7	8	1	3	4	5	7	7	9	13
Black cherry	33	3	8	15	27	36	36	38	35	31	36	46	35
Butternut	7	4	4	5	8	7	10	12	9	6	2	4	7
Elm	19	9	10	12	16	15	15	16	19	22	27	29	20
Paper birch	57	7	10	19	35	55	77	86	83	85	68	42	41
Other hardwoods	3	0	0	3	6	5	3	4	2	4	4	2	4
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,309	220	308	440	641	969	1,275	1,460	1,596	1,683	1,613	1,718	1,538
Total all species	1,411	276	400	567	815	1,098	1,377	1,567	1,682	1,787	1,730	1,831	1,593
Number of plots	4,796	148	213	254	307	301	413	488	552	500	387	601	632
Standard error	75	116	138	164	190	214	255	272	284	305	275	225	196
Average basal area	105	38	48	61	76	95	106	116	121	124	122	122	116

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 24.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 1/

Data from a 30-year projection

Forest type - Elm-ash-soft maple All sites

(In cubic feet per acre)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	31	1	4	8	13	20	31	38	42	48	57	44	29
Red pine	0	1	0	0	0	0	0	0	1	1	0	0	0
Jack pine	1	0	0	0	1	1	3	3	3	1	0	0	0
White spruce	17	1	2	4	8	15	18	27	23	19	28	26	16
Black spruce	2	0	0	0	1	2	4	5	1	2	0	1	1
Balsam fir	79	6	8	23	40	73	93	121	126	107	95	74	85
Hemlock	21	0	2	3	3	5	6	12	20	27	39	46	75
Tamarack	11	3	4	7	10	11	13	16	16	17	14	7	0
Northern white-cedar	59	15	17	24	30	31	39	58	78	83	104	78	116
Other softwoods	1	0	0	0	1	2	3	4	5	0	0	0	0
Total softwoods	222	27	37	69	107	160	210	284	315	305	337	276	322
Hardwoods													
Select white oak	18	9	14	14	18	14	12	14	15	19	27	37	20
Select red oak	18	2	2	1	6	7	13	20	25	27	31	38	29
Other red oak	8	3	4	3	5	6	7	8	12	11	15	12	1
Hickory	0	0	0	0	2	2	0	0	0	0	0	0	0
Yellow birch	18	0	0	5	9	15	21	21	21	22	25	25	34
Hard maple	23	1	3	8	12	23	25	30	31	30	30	31	21
Soft maple	340	37	72	129	201	280	332	392	426	449	462	506	438
Beech	0	0	0	0	0	0	0	0	0	1	2	3	0
Ash	363	59	80	168	255	341	411	407	414	423	471	505	484
Balsam poplar	7	2	3	5	8	10	11	11	9	8	10	0	2
Cottonwood	13	5	6	7	7	14	16	17	22	12	9	11	16
Bigtooth aspen	5	4	5	6	6	6	7	8	9	5	2	0	0
Quaking aspen	75	35	33	54	78	106	125	119	110	57	50	35	15
Basswood	36	4	6	8	9	18	24	34	44	50	65	77	61
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	2	1	1	1	0	0	0	0	0	0	0	0
Black cherry	3	1	1	1	1	9	4	5	5	3	3	1	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	85	18	27	48	63	68	87	94	89	108	117	116	123
Paper birch	48	12	18	32	46	57	62	68	62	58	48	39	16
Other hardwoods	40	16	33	43	57	45	41	45	39	42	25	47	15
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,100	210	308	533	784	1,021	1,198	1,293	1,333	1,325	1,392	1,483	1,275
Total all species	1,322	237	345	602	891	1,181	1,408	1,577	1,648	1,630	1,729	1,759	1,597
Number of plots	2,424	77	133	173	229	228	231	258	262	228	195	245	165
Standard error	69	91	100	141	168	202	235	259	265	259	289	243	262
Average basal area	97	29	43	60	77	93	103	110	114	114	117	120	114

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 25.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 1/

Data from a 30-year projection

Forest type - Maple-birch All sites

(In cubic feet per acre)

Species group	Average 2/	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	52	4	12	20	34	43	35	42	50	65	79	72	90
Red pine	7	4	6	9	11	9	3	4	5	8	7	5	14
Jack pine	2	2	3	7	9	8	1	0	1	1	1	0	0
White spruce	14	0	2	3	6	9	12	17	19	17	23	16	14
Black spruce	1	0	0	1	1	1	1	1	1	1	0	1	0
Balsam fir	44	12	23	34	46	50	48	54	55	51	46	35	29
Hemlock	83	3	6	7	10	15	18	24	31	40	60	142	448
Tamarack	1	0	0	0	1	1	1	1	2	2	1	0	1
Northern white-cedar	19	1	2	3	4	5	8	13	17	21	25	29	60
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	223	26	54	84	122	141	127	156	181	206	242	300	656
Hardwoods													
Select white oak	23	10	18	20	24	21	17	17	20	25	29	38	26
Select red oak	93	18	30	45	60	76	92	99	112	120	119	126	90
Other red oak	8	3	8	15	15	12	9	6	7	8	6	5	3
Hickory	16	5	8	13	18	23	21	19	17	12	11	17	17
Yellow birch	47	3	5	5	12	22	25	36	41	49	62	81	132
Hard maple	523	58	84	125	201	277	382	517	634	704	756	759	831
Soft maple	225	43	80	135	203	233	239	271	312	279	255	211	140
Beech	9	1	1	4	4	5	4	2	3	5	6	16	38
Ash	98	15	19	34	54	80	106	119	138	132	136	113	68
Balsam poplar	1	0	0	0	0	1	3	3	1	1	1	0	0
Cottonwood	1	1	1	2	2	1	0	0	0	0	0	2	1
Bigtooth aspen	32	4	8	11	17	28	42	48	50	49	37	30	4
Quaking aspen	95	27	47	87	129	151	135	134	121	109	62	35	14
Basswood	249	20	31	57	92	189	259	325	374	363	352	258	181
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	1	0	0	0	1	1	1	0	1	1	1	1	1
Black cherry	27	8	15	24	36	36	31	29	30	29	29	27	14
Butternut	6	1	5	8	10	10	5	3	4	5	7	9	6
Elm	71	14	25	42	59	70	74	83	77	78	77	75	82
Paper birch	73	11	25	43	62	73	81	93	95	94	87	68	39
Other hardwoods	4	0	0	1	5	5	5	7	3	4	5	4	1
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,602	242	410	671	1,004	1,314	1,531	1,811	2,040	2,067	2,038	1,875	1,688
Total all species	1,825	268	464	755	1,126	1,455	1,658	1,967	2,221	2,273	2,280	2,175	2,344
Number of plots	7,548	156	286	397	510	635	818	941	944	775	535	714	837
Standard error	109	119	136	167	203	254	300	354	419	467	464	291	332
Average basal area	121	34	55	74	95	111	119	131	141	141	139	131	134

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 26.--Cubic foot volume per acre in growing-stock trees by species[1/] group and stand-age class, All Units, Wisconsin, 1983

Data from a 30-year projection

Forest type - Aspen All sites

(In cubic feet per acre)

Species group	Average[2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	27	6	9	13	17	15	22	34	46	78	103	157	0
Red pine	34	11	17	26	35	23	29	39	44	78	93	81	0
Jack pine	21	7	11	17	23	26	24	23	22	15	30	18	0
White spruce	41	5	10	22	36	33	44	58	69	78	56	82	0
Black spruce	5	1	3	4	5	5	6	6	7	7	3	0	0
Balsam fir	68	10	19	34	56	60	79	97	110	113	123	114	0
Hemlock	1	1	0	0	1	0	0	1	1	2	7	17	0
Tamarack	3	1	2	2	3	2	2	3	4	5	10	15	0
Northern white-cedar	7	1	2	3	4	3	6	9	14	25	24	37	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	207	43	73	121	180	167	212	270	317	401	449	521	0
Hardwoods													
Select white oak	13	5	6	8	11	12	14	18	17	20	30	25	60
Select red oak	52	8	14	22	28	39	56	72	91	128	131	149	762
Other red oak	16	7	7	10	12	13	17	18	26	26	37	62	114
Hickory	1	0	0	2	2	1	1	1	0	1	3	0	0
Yellow birch	2	0	0	1	2	1	1	2	3	5	7	2	0
Hard maple	30	8	9	16	21	22	30	40	54	66	68	68	0
Soft maple	124	27	49	73	105	112	127	165	199	215	230	220	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	18	5	6	11	17	19	20	23	22	25	30	11	0
Balsam poplar	10	1	2	2	4	6	12	16	17	26	25	54	0
Cottonwood	1	1	1	2	2	0	1	1	2	4	0	0	0
Bigtooth aspen	186	18	27	48	83	147	229	302	377	393	333	401	1,188
Quaking aspen	625	94	169	321	499	748	810	915	882	715	744	586	102
Basswood	14	2	6	8	12	18	14	18	22	22	20	9	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	14	2	4	9	15	17	18	20	18	10	13	9	0
Butternut	0	0	0	0	0	0	0	1	1	2	3	0	0
Elm	10	3	4	7	11	9	11	11	11	15	17	11	147
Paper birch	131	23	33	59	90	118	163	201	221	235	167	158	147
Other hardwoods	1	0	0	0	1	1	1	1	1	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,248	204	337	599	915	1,283	1,525	1,825	1,964	1,908	1,858	1,765	2,520
Total all species	1,455	247	410	720	1,095	1,450	1,737	2,095	2,281	2,309	2,307	2,286	2,520
Number of plots	6,432	322	545	701	930	945	931	852	658	339	132	75	2
Standard error	106	108	134	178	202	260	310	403	505	558	552	526	3/
Average basal area	97	29	44	64	80	99	112	129	136	139	136	128	117

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 27.--Cubic foot volume per acre in growing-stock trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Data from a 30-year projection

Forest type - Paper birch All sites

(In cubic feet per acre)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	48	19	17	21	37	26	34	51	55	110	120	80	0
Red pine	40	18	15	18	20	14	21	33	52	82	176	184	0
Jack pine	5	0	0	1	4	8	9	7	5	2	0	0	0
White spruce	47	0	0	11	15	23	40	47	81	109	64	140	68
Black spruce	6	7	5	5	3	1	6	6	8	15	0	0	0
Balsam fir	99	4	10	20	44	73	94	119	159	166	142	64	156
Hemlock	8	0	0	1	3	3	4	7	7	13	35	94	68
Tamarack	7	0	13	14	12	7	4	4	4	7	11	25	0
Northern white-cedar	20	0	5	6	8	19	18	23	29	21	42	62	52
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	280	48	65	97	146	174	230	297	400	525	590	649	344
Hardwoods													
Select white oak	17	13	31	25	28	23	11	14	11	10	18	14	50
Select red oak	115	24	32	36	57	75	113	142	162	199	201	92	0
Other red oak	5	0	0	0	3	5	6	5	5	7	9	37	0
Hickory	5	2	3	5	8	10	8	5	1	0	0	0	0
Yellow birch	4	0	0	2	1	3	3	4	7	7	6	26	43
Hard maple	41	2	3	5	10	18	34	52	66	82	102	62	0
Soft maple	133	18	39	61	84	117	132	155	187	171	200	138	136
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	26	0	1	8	18	25	27	34	37	28	45	30	15
Balsam poplar	3	5	4	4	4	2	2	3	1	2	6	10	88
Cottonwood	0	0	0	1	1	0	0	0	0	0	0	0	0
Bigtooth aspen	69	2	10	19	33	47	67	77	92	121	142	184	0
Quaking aspen	196	38	66	117	144	182	214	229	275	213	174	156	162
Basswood	17	0	4	5	8	13	15	19	25	31	9	10	133
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	7	0	0	0	2	5	6	10	12	9	13	8	0
Butternut	0	0	0	0	1	1	1	1	0	0	0	0	0
Elm	11	5	9	12	16	17	13	14	7	4	3	0	0
Paper birch	787	133	234	328	569	729	821	976	989	983	964	832	704
Other hardwoods	1	0	0	0	1	1	1	1	0	0	2	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	1,437	242	436	628	988	1,273	1,474	1,741	1,877	1,867	1,894	1,599	1,331
Total all species	1,717	290	501	725	1,134	1,447	1,704	2,038	2,277	2,392	2,484	2,248	1,675
Number of plots	1,288	27	53	82	123	174	216	227	195	118	51	16	6
Standard error	144	125	147	173	213	288	329	402	519	616	955	797	877
Average basal area	116	28	48	68	88	108	120	134	143	144	146	128	104

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 28.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Jack pine All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,213	0	399	488	720	937	4,709	2,536	5,432	9,826	0	0	0
Red pine	4,371	1,518	3,540	3,339	2,417	5,478	4,702	19,302	18,640	31,659	0	0	0
Jack pine	61,349	19,259	42,629	64,147	76,093	68,492	70,949	46,774	80,792	50,131	0	0	0
White spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Black spruce	127	0	223	0	0	0	274	0	3,034	0	0	0	0
Balsam fir	94	0	0	0	352	0	0	0	0	3,830	0	0	0
Hemlock	0	0	0	0	0	0	0	0	0	0	0	0	0
Tamarack	4	0	22	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	0	0	0	0	0	0	0	0	0	0	0	0	0
Other softwoods	25	0	0	0	0	0	0	0	1,342	0	0	0	0
Total softwoods	67,183	20,777	46,813	67,974	79,582	74,907	80,634	68,612	109,240	95,446	0	0	0
Hardwoods													
Select white oak	564	242	269	178	411	1,315	414	0	1,978	0	0	0	0
Select red oak	1,522	64	756	0	2,899	2,129	0	0	11,219	7,798	0	0	0
Other red oak	7,025	766	3,389	2,922	4,866	14,208	11,472	5,038	15,358	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	0	0	0	0	0	0	0	0	0	0	0	0	0
Hard maple	0	0	0	0	0	0	0	0	0	0	0	0	0
Soft maple	363	0	137	134	279	754	381	0	2,330	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	48	0	95	0	137	0	0	0	0	0	0	0	0
Bigtooth aspen	727	248	1,084	105	0	1,223	2,076	0	0	0	0	0	0
Quaking aspen	5,007	1,348	2,375	3,696	9,437	4,621	5,024	8,669	1,866	6,314	0	0	0
Basswood	19	0	0	0	0	84	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	40	0	0	0	0	24	289	177	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	85	0	0	0	377	0	0	0	0	0	0	0	0
Paper birch	694	0	415	1,038	378	1,165	106	565	5,101	0	0	0	0
Other hardwoods	137	0	0	0	0	607	0	0	0	0	0	0	0
Noncommercial species	55	492	0	0	88	0	0	0	0	0	0	0	0
Total hardwoods	16,286	3,160	8,520	8,073	18,872	26,130	19,762	14,449	37,852	14,112	0	0	0
Total all species	83,469	23,937	55,333	76,047	98,454	101,037	100,396	83,061	147,092	109,558	0	0	0
Number of plots	261	19	47	38	59	59	28	5	5	1	0	0	0
Standard error	14,015	13,087	28,714	30,633	33,081	39,150	33,623	53,878	111,204	3/	0	0	0
Average basal area	71	22	48	67	84	84	85	69	110	80	0	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 29.--Biomass yields per acre in all live trees by species group [1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Red pine All sites

(In pounds per acre green weight)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	7,202	150	2,889	2,358	4,019	17,273	16,757	8,153	38,290	34,991	29,191	41,096	0
Red pine	93,627	7,292	61,938	136,674	125,539	105,323	98,542	77,374	84,962	104,210	83,749	74,535	0
Jack pine	5,107	143	1,215	6,470	7,793	11,218	8,390	9,288	7,365	0	3,056	0	0
White spruce	926	458	473	1,089	605	140	0	1,919	0	6,269	4,963	8,800	0
Black spruce	585	0	0	569	0	870	990	10,975	3,832	0	0	2,869	0
Balsam fir	1,351	110	0	117	1,914	133	2,363	18,398	3,425	2,461	7,970	11,665	0
Hemlock	348	0	0	0	0	0	0	0	7,724	0	5,824	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	110	0	0	0	0	0	0	0	0	3,810	1,333	0	0
Other softwoods	788	0	1,829	85	0	2,287	3,377	0	0	0	0	0	0
Total softwoods	110,044	8,153	68,344	147,362	139,870	137,244	130,419	126,107	145,598	151,741	136,086	138,965	0
Hardwoods													
Select white oak	341	0	948	263	9	0	697	0	0	0	1,002	0	0
Select red oak	2,253	251	1,689	0	1,948	438	17,595	0	4,530	10,549	6,392	3,959	0
Other red oak	3,471	16	5,326	5,841	2,678	0	5,120	0	0	2,092	1,984	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	43	0	0	0	0	0	0	0	0	305	1,327	0	0
Hard maple	1,162	474	747	0	2,312	2,595	0	0	4,700	6,158	1,215	3,358	0
Soft maple	2,348	0	449	0	644	11,678	0	594	15,528	25,459	5,463	17,751	0
Beech	81	0	365	0	0	0	0	0	0	0	0	0	0
Ash	133	0	441	0	0	396	0	0	0	0	101	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	1,108	0	258	477	2,835	0	0	4,913	6,190	3,649	1,993	3,378	0
Quaking aspen	5,575	30	3,992	2,214	11,800	5,088	5,226	14,952	24,415	6,178	5,019	11,197	0
Basswood	40	0	131	0	0	139	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	191	344	253	143	12	0	0	908	0	2,205	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	128	0	0	0	0	1,276	0	0	0	0	915	0	0
Paper birch	1,984	1,367	443	759	680	2,350	9,732	7,281	0	12,491	5,717	19,362	0
Other hardwoods	653	0	984	0	2,289	0	0	0	0	0	0	0	0
Noncommercial species	79	0	97	7	161	0	0	262	0	1,095	0	0	0
Total hardwoods	19,590	2,482	16,123	9,704	25,368	23,960	38,370	28,910	55,363	70,181	31,128	59,005	0
Total all species	129,634	10,635	84,467	157,066	165,238	161,204	168,789	155,017	200,961	221,922	167,214	197,970	0
Number of plots	211	24	47	51	40	17	11	4	5	4	6	2	0
Standard error	23,499	7,063	31,662	66,311	65,108	95,618	78,145	122,739	132,554	198,954	74,597	3/	0
Average basal area	100	9	65	127	130	127	124	116	138	145	115	128	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 30.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - White pine All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	70,209	18,945	53,191	47,181	41,469	80,067	55,918	62,733	93,336	75,712	57,951	86,958	128,705
Red pine	12,680	4,676	12,027	18,951	16,368	18,105	11,344	20,814	15,890	6,998	9,126	13,840	5,391
Jack pine	4,284	0	0	4,849	6,164	5,420	10,893	9,722	4,205	1,750	0	4,533	0
White spruce	1,784	774	4,194	1,529	0	0	0	963	7,476	1,630	0	1,130	0
Black spruce	1,832	0	0	4,994	0	1,795	4,504	0	3,252	2,751	0	0	1,201
Balsam fir	4,821	319	2,044	0	0	0	647	874	8,887	12,701	0	1,792	16,028
Hemlock	1,251	0	0	0	0	2,813	0	0	2,107	1,121	0	1,624	4,897
Tamarack	445	0	0	0	0	0	2,184	0	0	809	3,488	0	458
Northern white-cedar	606	0	0	0	0	0	0	0	0	598	0	807	5,044
Other softwoods	86	0	0	0	0	0	812	0	0	0	0	0	0
Total softwoods	97,998	24,714	71,456	77,504	64,001	108,200	86,302	95,106	135,153	104,070	70,565	110,684	161,724
Hardwoods													
Select white oak	2,489	495	0	0	652	4,240	2,881	5,361	1,755	3,035	3,587	4,049	3,347
Select red oak	2,295	0	0	0	0	473	6,178	2,667	2,925	582	8,019	1,486	7,026
Other red oak	6,553	0	2,333	0	6,622	3,233	6,329	33,329	4,535	4,915	4,416	13,378	0
Hickory	162	0	0	0	1,828	0	0	0	0	0	931	0	0
Yellow birch	278	0	3,937	0	0	0	0	0	0	0	0	0	0
Hard maple	1,215	0	3,474	0	0	0	0	0	0	1,066	0	9,714	4,091
Soft maple	7,121	2,346	1,773	1,652	2,057	584	4,878	10,267	11,657	7,740	11,387	12,680	17,834
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	730	0	0	0	0	0	0	0	1,662	931	0	8,735	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	1,933	0	0	34,731	0	0	0	0	672	0	0	0	0
Bigtooth aspen	1,747	0	702	4,436	0	762	1,353	691	6,995	1,916	0	0	0
Quaking aspen	13,778	3,732	10,581	7,958	22,227	12,911	18,525	21,824	12,319	16,870	0	15,569	8,419
Basswood	407	0	0	0	0	0	944	0	0	376	0	0	2,636
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	27	0	0	0	0	0	0	0	0	203	0	0	0
Black cherry	933	318	1,570	236	1,090	191	0	2,795	346	980	0	5,758	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	339	0	884	1,579	0	953	601	0	0	276	0	0	0
Paper birch	5,873	0	0	1,462	2,249	7,500	6,670	0	9,957	10,975	0	6,010	11,645
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	383	0	0	123	0	0	87	0	177	916	3,441	3,550	44
Total hardwoods	46,263	6,891	25,254	52,177	36,725	30,847	48,446	76,934	53,000	50,781	31,781	80,929	55,042
Total all species	144,261	31,605	96,710	129,681	100,726	139,047	134,748	172,040	188,153	154,851	102,346	191,613	216,766
Number of plots	113	9	8	6	9	11	12	10	15	15	2	5	11
Standard error	23,330	16,965	46,727	74,295	54,121	58,534	57,697	90,401	108,502	58,682	3/	130,775	105,817
Average basal area	100	28	86	96	83	110	100	117	121	106	73	120	124

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 31.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Black spruce All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,744	77	2,942	718	2,333	1,936	337	0	7,358	3,566	3,202	0	0
Red pine	1,111	590	1,924	741	935	265	1,877	0	5,697	0	0	0	0
Jack pine	138	0	0	32	0	0	1,019	0	0	2,051	0	0	0
White spruce	230	0	0	135	0	243	0	0	3,377	0	0	0	0
Black spruce	43,529	22,289	32,603	33,434	53,458	70,524	44,732	49,730	62,191	96,001	17,702	0	7,137
Balsam fir	4,059	2,185	1,616	1,671	1,856	6,418	9,494	7,957	14,724	9,127	8,173	0	0
Hemlock	998	0	972	0	0	919	0	0	3,394	7,231	22,367	0	0
Tamarack	8,275	4,998	5,029	8,845	11,391	7,396	15,981	9,833	7,175	10,755	0	0	9,416
Northern white-cedar	1,803	385	2,267	84	0	1,992	855	2,828	6,941	11,792	12,837	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	61,887	30,524	47,353	45,660	69,973	89,693	74,295	70,348	110,857	140,523	64,281	0	16,553
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	524	325	312	1,052	0	1,384	0	0	0	0	0	0	0
Other red oak	40	0	0	0	0	0	0	0	821	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	552	24	487	278	0	298	1,718	1,225	1,778	3,086	0	0	0
Hard maple	367	0	0	492	0	1,295	0	0	1,816	0	0	0	0
Soft maple	1,524	0	1,192	445	234	2,672	4,826	5,517	4,436	0	5,694	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	50	0	0	0	0	0	0	892	0	0	0	0	0
Balsam poplar	74	0	0	0	0	0	0	1,328	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	474	0	0	1,261	238	0	0	0	2,164	0	0	0	0
Quaking aspen	5,258	4,429	2,455	7,528	4,913	7,181	9,441	2,403	5,013	0	0	0	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	192	0	0	0	67	0	0	845	1,096	0	5,861	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	0	0	0	0	0	0	0	0	0	0	0	0	0
Paper birch	2,352	166	2,590	2,572	2,229	3,597	2,500	3,025	3,005	2,224	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	11,407	4,944	7,036	13,628	7,681	16,427	18,485	15,235	20,129	5,310	11,555	0	0
Total all species	73,294	35,468	54,389	59,288	77,654	106,120	92,780	85,583	130,986	145,833	75,836	0	16,553
Number of plots	142	16	23	38	18	16	8	8	7	5	2	0	1
Standard error	16,249	28,111	33,186	38,851	53,547	52,743	57,460	50,050	87,189	98,609	3/	0	3/
Average basal area	60	30	46	48	65	86	76	69	106	120	63	0	15

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 32.--Biomass yields per acre in all live trees by species group [1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Balsam fir All sites

(In pounds per acre green weight)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	2,075	1,668	351	648	988	2,379	2,526	540	3,663	851	10,027	22,044	3,203
Red pine	663	358	1,369	234	0	497	916	216	0	3,147	3,343	1,837	0
Jack pine	144	625	0	0	0	0	259	0	0	0	0	0	0
White spruce	5,168	990	1,788	2,813	7,646	7,761	7,118	3,027	10,387	8,300	5,206	12,209	1,594
Black spruce	3,587	2,509	1,427	2,943	4,216	3,942	3,570	4,368	11,553	0	0	9,645	0
Balsam fir	52,957	15,233	30,697	36,543	59,439	64,699	72,054	69,136	57,477	61,961	46,780	50,193	41,644
Hemlock	1,768	723	0	672	1,995	1,328	1,719	1,055	5,074	3,120	0	0	31,134
Tamarack	1,056	296	615	1,300	307	394	1,214	1,444	1,177	530	0	11,889	0
Northern white-cedar	8,879	2,759	8,112	5,203	15,323	8,565	8,229	11,382	14,448	15,524	0	6,927	34,044
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	76,297	25,161	44,359	50,356	89,914	89,565	97,605	91,168	103,779	93,433	65,356	114,744	111,619
Hardwoods													
Select white oak	47	161	0	0	340	0	0	0	0	0	0	0	0
Select red oak	230	254	473	0	0	938	132	0	0	297	0	0	0
Other red oak	30	0	0	0	0	0	0	0	0	805	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	2,845	1,423	2,074	2,201	0	4,581	2,293	4,218	4,931	8,462	0	1,858	4,745
Hard maple	1,424	1,208	0	2,388	0	1,885	2,955	88	0	1,630	0	0	0
Soft maple	6,782	2,649	4,073	4,500	5,452	10,328	8,324	2,810	6,615	28,662	20,944	4,645	703
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	3,889	2,983	2,789	3,701	5,253	6,504	2,012	7,178	2,749	4,292	0	0	0
Balsam poplar	374	0	0	0	421	0	1,489	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	440	359	3,687	0	0	326	235	0	0	0	0	0	1,332
Quaking aspen	10,330	3,771	13,150	7,122	6,188	22,463	12,015	8,068	3,994	6,029	7,369	24,488	1,537
Basswood	48	0	0	207	0	0	0	200	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	1,577	554	362	808	0	1,301	4,907	709	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	833	259	0	258	471	2,117	890	1,580	0	0	0	0	4,275
Paper birch	6,662	3,446	4,314	6,385	7,782	8,988	7,679	7,303	10,229	3,946	0	9,474	1,651
Other hardwoods	31	0	0	0	0	245	0	0	0	0	0	0	0
Noncommercial species	358	0	0	16	479	1,776	264	204	0	232	0	0	0
Total hardwoods	35,900	17,067	30,922	27,586	26,386	61,452	43,195	32,358	28,518	54,355	28,313	40,465	14,243
Total all species	112,197	42,228	75,281	77,942	116,300	151,017	140,800	123,526	132,297	147,788	93,669	155,209	125,862
Number of plots	213	29	16	24	16	27	49	27	8	8	2	4	3
Standard error	17,572	19,096	36,725	28,401	49,706	57,845	54,791	53,405	89,681	65,712	[3/]	88,457	90,936
Average basal area	85	33	60	61	93	111	105	94	105	105	68	107	115

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 33.--Biomass yields per acre in all live trees by species group and stand-age class, All Units, Wisconsin, 1983 1/

Forest type - Northern white-cedar All sites

(In pounds per acre green weight)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,835	1,343	0	0	1,673	982	1,906	643	811	825	3,548	412	5,241
Red pine	59	0	0	0	0	270	0	0	0	0	0	334	0
Jack pine	90	0	0	0	0	0	0	0	1,032	0	0	0	0
White spruce	1,568	0	682	568	0	1,737	3,097	2,588	1,818	1,206	778	1,992	1,356
Black spruce	4,767	7,851	1,900	4,439	3,057	4,545	3,101	6,574	3,946	5,781	2,683	275	9,586
Balsam fir	18,588	2,085	3,503	13,459	6,085	22,850	15,216	28,573	22,503	12,804	18,094	18,905	22,043
Hemlock	3,597	1,022	0	0	0	1,031	2,342	1,366	998	2,473	5,203	2,376	13,090
Tamarack	4,306	0	8,249	4,710	2,239	11,978	7,387	4,431	4,393	0	3,611	778	972
Northern white-cedar	79,177	15,595	52,406	59,705	35,920	71,595	73,513	93,050	77,150	71,984	99,533	90,371	92,053
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	113,987	27,896	66,740	82,881	48,974	114,988	106,562	137,225	112,651	95,073	133,450	115,443	144,341
Hardwoods													
Select white oak	34	1,462	0	0	0	0	0	0	0	0	0	0	0
Select red oak	119	0	0	652	0	0	0	0	923	0	0	0	0
Other red oak	72	0	0	586	0	0	0	0	434	0	0	0	0
Hickory	132	1,631	0	0	0	468	0	0	0	0	0	487	0
Yellow birch	4,860	0	0	0	3,799	1,934	4,112	3,391	3,490	4,969	5,441	6,480	12,385
Hard maple	377	0	0	0	0	0	0	55	0	1,066	1,429	462	385
Soft maple	3,944	4,216	7,897	2,193	6,900	987	4,988	3,261	5,431	3,467	6,154	3,322	3,037
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	8,130	0	1,443	2,593	6,073	2,384	4,705	10,059	10,671	6,290	9,488	12,124	15,317
Balsam poplar	308	0	0	0	0	265	0	412	0	0	1,451	551	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	354	0	0	0	0	0	3,047	622	0	0	0	0	0
Quaking aspen	3,502	1,216	4,731	0	9,670	7,189	8,007	5,202	2,982	1,943	882	3,458	388
Basswood	264	1,014	0	0	0	0	0	0	0	0	1,124	1,179	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	55	0	0	0	0	0	369	0	0	235	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	878	1,381	1,190	0	741	518	825	2,628	588	593	1,412	324	260
Paper birch	8,076	1,708	9,823	11,992	13,735	10,832	9,418	13,067	7,010	6,783	5,324	7,857	3,237
Other hardwoods	152	0	0	0	1,789	69	479	0	0	264	0	0	234
Noncommercial species	65	0	0	0	0	118	0	0	0	556	0	0	20
Total hardwoods	31,322	12,628	25,084	18,016	42,707	24,764	35,950	38,697	31,529	26,166	32,705	36,244	35,263
Total all species	145,309	40,524	91,824	100,897	91,681	139,752	142,512	175,922	144,180	121,239	166,155	151,687	179,604
Number of plots	171	4	7	10	4	20	16	19	15	15	22	14	25
Standard error	35,799	37,279	53,619	59,542	75,416	75,467	72,213	128,737	125,457	83,808	135,144	129,173	137,697
Average basal area	130	39	80	92	74	120	123	153	131	116	154	141	158

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 34.--Biomass yields per acre in all live trees by species group 1/ and stand-age class, All Units, Wisconsin, 1983

Forest type - Tamarack All sites

(In pounds per acre green weight)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	2,088	1,859	1,458	680	305	1,377	2,587	2,180	6,749	2,093	0	17,778	0
Red pine	132	0	0	213	0	0	0	585	648	0	0	0	0
Jack pine	287	0	0	159	0	2,119	1,298	0	0	0	0	0	0
White spruce	515	492	0	1,068	0	628	352	586	0	0	0	0	7,640
Black spruce	7,511	6,328	4,097	11,738	17,406	8,176	9,139	3,638	6,555	2,497	0	18,823	1,866
Balsam fir	3,419	242	2,504	2,916	2,930	7,630	3,881	3,461	3,488	10,885	0	0	0
Hemlock	65	0	0	171	0	0	0	0	0	499	0	0	0
Tamarack	37,840	21,141	20,241	32,104	61,908	38,387	54,647	66,779	62,715	40,510	0	42,632	41,303
Northern white-cedar	995	238	0	320	0	396	1,172	1,102	4,237	6,072	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	52,852	30,300	28,300	49,369	82,549	58,713	73,076	78,331	84,392	62,556	0	79,233	50,809
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	62	462	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	159	0	301	237	0	0	0	0	562	0	0	710	0
Hard maple	130	0	597	0	0	0	0	0	0	0	0	0	0
Soft maple	2,452	1,590	761	2,606	1,705	3,674	5,762	3,260	7,481	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	497	0	0	0	0	0	0	2,063	4,822	0	0	0	0
Balsam poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	845	1,402	0	0	0	7,353	1,336	0	0	0	0	0	0
Quaking aspen	2,304	246	2,578	1,438	1,534	10,903	0	3,456	1,374	2,153	0	0	0
Basswood	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	82	0	0	240	0	408	98	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	490	0	0	0	1,278	1,468	0	0	1,781	2,742	0	0	0
Paper birch	3,628	3,562	2,026	1,621	3,571	11,899	3,270	5,795	6,611	799	0	3,825	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	10,649	7,262	6,263	6,142	8,088	35,705	10,466	14,574	22,631	5,694	0	4,535	0
Total all species	63,501	37,562	34,563	55,511	90,637	94,418	83,542	92,905	107,023	68,250	0	83,768	50,809
Number of plots	119	16	26	22	7	9	9	10	8	8	0	2	2
Standard error	11,587	17,280	16,404	36,046	52,967	54,746	51,655	45,532	60,125	40,539	0	3/	3/
Average basal area	50	29	28	45	72	70	65	68	79	57	0	71	43

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 35.--Biomass yields per acre in all live trees by species group [1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - White spruce All sites

(In pounds per acre green weight)

Species group	Average [2/]	Stand-age class (years)											
		0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	4,233	0	7,401	0	1,056	0	3,378	53,635	0	0	0	0	0
Red pine	817	0	1,397	1,068	1,720	0	0	0	0	0	0	0	0
Jack pine	0	0	0	0	0	0	0	0	0	0	0	0	0
White spruce	90,976	3,286	48,198	132,018	179,496	95,655	120,859	105,522	0	0	0	0	0
Black spruce	558	0	0	822	2,247	0	0	0	0	0	0	0	0
Balsam fir	8,727	0	3,011	0	10,822	27,801	11,119	49,079	0	0	0	0	0
Hemlock	597	0	1,016	0	1,887	0	0	0	0	0	0	0	0
Tamarack	0	0	0	0	0	0	0	0	0	0	0	0	0
Northern white-cedar	2,887	0	0	0	15,017	0	0	0	0	0	0	0	0
Other softwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Total softwoods	108,795	3,286	61,023	133,908	212,245	123,456	135,356	208,236	0	0	0	0	0
Hardwoods													
Select white oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Select red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Other red oak	0	0	0	0	0	0	0	0	0	0	0	0	0
Hickory	0	0	0	0	0	0	0	0	0	0	0	0	0
Yellow birch	814	0	2,150	0	1,655	0	0	0	0	0	0	0	0
Hard maple	2,034	0	2,593	0	1,489	9,959	0	0	0	0	0	0	0
Soft maple	2,805	0	0	0	14,588	0	0	0	0	0	0	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	1,787	0	0	0	2,542	8,774	0	7,428	0	0	0	0	0
Balsam poplar	1,648	0	0	0	0	0	21,430	0	0	0	0	0	0
Cottonwood	0	0	0	0	0	0	0	0	0	0	0	0	0
Bigtooth aspen	296	0	0	0	0	2,568	0	0	0	0	0	0	0
Quaking aspen	7,320	5,872	8,214	0	0	21,096	20,636	7,114	0	0	0	0	0
Basswood	190	0	0	0	0	1,650	0	0	0	0	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	1,572	0	6,812	0	0	0	0	0	0	0	0	0	0
Butternut	0	0	0	0	0	0	0	0	0	0	0	0	0
Elm	362	0	1,570	0	0	0	0	0	0	0	0	0	0
Paper birch	1,291	0	0	0	0	0	3,943	25,687	0	0	0	0	0
Other hardwoods	0	0	0	0	0	0	0	0	0	0	0	0	0
Noncommercial species	0	0	0	0	0	0	0	0	0	0	0	0	0
Total hardwoods	20,119	5,872	21,339	0	20,274	44,047	46,009	40,229	0	0	0	0	0
Total all species	128,914	9,158	82,362	133,908	232,519	167,503	181,365	248,465	0	0	0	0	0
Number of plots	26	5	6	4	5	3	2	1	0	0	0	0	0
Standard error	43,995	7,798	46,695	141,681	187,055	120,744	3/	3/	0	0	0	0	0
Average basal area	99	7	68	122	168	128	132	152	0	0	0	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 36.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Oak-hickory All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,488	1,090	840	406	661	821	1,229	1,241	3,763	1,452	1,866	859	2,995
Red pine	703	545	859	302	1,965	528	552	893	533	2,512	291	63	0
Jack pine	2,758	4,423	4,258	3,762	6,690	3,708	3,032	3,136	1,232	824	2,589	370	217
White spruce	12	0	0	354	0	0	0	0	0	0	0	0	0
Black spruce	0	0	0	0	0	0	0	0	0	0	0	0	0
Balsam fir	102	85	0	0	628	23	21	597	0	0	0	0	0
Hemlock	52	0	0	226	130	0	0	0	384	0	0	16	0
Tamarack	27	0	0	0	100	8	0	139	0	115	0	0	0
Northern white-cedar	5	0	0	0	0	0	0	55	0	0	0	0	0
Other softwoods	132	323	512	334	131	18	77	26	0	377	0	0	42
Total softwoods	5,279	6,466	6,469	5,384	10,305	5,106	4,911	6,087	5,912	5,280	4,746	1,308	3,254
Hardwoods													
Select white oak	25,322	6,437	12,239	16,931	19,646	19,858	20,226	27,680	25,700	37,674	43,773	37,972	49,397
Select red oak	42,157	7,320	12,897	17,676	19,729	44,428	61,719	39,896	56,588	54,419	44,887	64,471	48,685
Other red oak	32,987	21,601	18,314	28,081	40,512	45,521	38,041	52,515	36,721	32,209	22,488	19,290	23,317
Hickory	6,025	2,594	3,871	4,361	9,000	7,110	4,689	6,410	5,950	7,884	7,573	7,731	7,970
Yellow birch	94	0	0	0	113	0	86	151	519	43	0	0	105
Hard maple	3,260	371	299	259	1,338	1,931	2,264	3,375	7,221	4,153	4,835	8,617	3,574
Soft maple	6,661	1,041	636	1,480	5,269	9,403	10,654	6,445	11,408	6,754	5,226	6,177	6,820
Beech	21	0	0	0	0	0	0	0	111	0	0	131	0
Ash	1,490	190	580	415	913	773	2,087	1,524	2,205	2,872	2,226	2,178	1,437
Balsam poplar	48	0	0	0	0	0	331	0	0	0	0	0	0
Cottonwood	232	130	338	432	135	256	229	651	71	445	0	115	0
Bigtooth aspen	5,154	1,264	907	1,621	4,765	7,403	8,662	7,080	7,885	5,599	2,541	3,312	3,351
Quaking aspen	3,674	2,357	1,749	5,860	3,362	7,359	6,321	3,356	2,610	2,426	2,107	1,971	1,354
Basswood	2,587	497	339	1,277	1,073	2,066	2,802	1,931	2,604	5,108	3,419	5,472	4,143
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	624	726	0	340	189	324	499	451	813	1,061	1,061	450	1,443
Black cherry	3,029	995	1,608	2,818	4,458	4,615	2,342	3,473	4,189	4,049	2,734	2,843	2,805
Butternut	705	822	211	0	2,175	840	628	607	103	257	970	1,685	353
Elm	2,466	1,478	1,236	1,999	1,873	2,326	1,400	2,677	2,469	3,530	4,119	3,733	3,998
Paper birch	5,052	1,421	1,691	5,514	7,756	6,078	8,384	8,603	4,588	1,793	5,366	3,157	4,592
Other hardwoods	700	398	1,261	654	95	346	970	486	763	1,612	321	575	892
Noncommercial species	2,007	1,472	1,989	4,030	1,694	754	1,430	1,570	2,825	2,470	2,066	2,910	3,313
Total hardwoods	144,295	51,114	60,165	93,748	124,095	161,391	173,764	168,881	175,343	174,358	155,712	172,790	167,549
Total all species	149,574	57,580	66,634	99,132	134,400	166,497	178,675	174,968	181,255	179,638	160,458	174,098	170,803
Number of plots	1,199	148	65	41	53	142	177	116	117	90	64	98	88
Standard error	15,570	20,651	27,910	34,822	45,382	55,220	56,575	53,197	51,519	56,586	51,681	54,102	61,817
Average basal area	85	38	45	63	82	95	100	100	100	98	89	95	95

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 37.--Biomass yields per acre in all live trees by species group 1/ and stand-age class, All Units, Wisconsin, 1983

Forest type - Elm-ash-soft maple All sites

(In pounds per acre green weight)

Species group	Average 2/	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,297	144	298	772	825	1,818	1,517	2,531	1,267	3,010	493	1,078	1,928
Red pine	29	63	0	0	0	0	127	0	89	0	0	0	0
Jack pine	96	0	136	0	329	280	188	0	0	0	0	0	0
White spruce	488	79	307	118	650	525	252	1,061	567	929	595	218	553
Black spruce	311	50	0	395	776	225	448	733	0	125	0	834	270
Balsam fir	5,724	748	2,981	3,870	4,778	7,964	6,571	9,421	7,409	5,502	4,213	8,544	9,056
Hemlock	1,694	167	610	763	125	666	1,352	2,831	2,624	2,113	2,663	7,123	5,768
Tamarack	716	353	454	820	1,295	471	593	1,121	1,589	828	0	0	0
Northern white-cedar	3,909	1,388	1,360	2,190	1,866	3,559	2,109	7,094	8,798	3,578	3,185	5,204	10,815
Other softwoods	104	0	187	0	0	660	0	0	47	0	0	0	0
Total softwoods	14,368	2,992	6,333	8,928	10,644	16,168	13,157	24,792	22,390	16,085	11,149	23,001	28,390
Hardwoods													
Select white oak	1,802	1,502	1,646	365	2,668	914	1,053	1,132	3,512	2,702	4,155	2,552	672
Select red oak	1,762	335	1,194	379	912	2,263	2,468	1,963	2,550	2,376	3,907	3,731	385
Other red oak	1,003	438	970	0	1,087	1,076	1,775	302	3,904	0	0	698	0
Hickory	110	92	157	0	29	206	0	0	370	270	0	0	0
Yellow birch	3,337	57	790	3,137	2,691	2,219	3,418	5,197	5,862	3,103	606	8,507	12,374
Hard maple	2,532	162	1,409	1,000	2,687	1,908	5,608	2,482	2,471	3,702	6,026	5,026	928
Soft maple	29,223	8,233	13,231	16,325	25,577	31,671	40,872	33,961	45,199	38,773	38,366	42,336	34,117
Beech	61	8	0	0	0	0	0	0	473	189	0	0	0
Ash	33,106	8,214	13,972	37,538	35,759	31,400	33,693	39,235	43,191	40,566	63,197	44,907	49,268
Balsam poplar	606	580	182	869	1,402	663	107	1,488	421	0	0	670	0
Cottonwood	806	474	700	547	0	2,351	816	175	508	1,796	0	0	2,200
Bigtooth aspen	323	446	349	0	0	784	908	352	86	0	0	0	0
Quaking aspen	5,616	3,743	3,479	5,509	10,626	11,621	7,503	3,895	2,541	2,200	8,507	1,990	0
Basswood	2,291	1,344	319	383	356	4,017	1,796	2,260	4,352	2,667	3,011	6,498	2,319
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	49	302	0	0	0	87	0	0	0	0	0	0	0
Black cherry	649	400	506	40	1,110	1,655	289	870	512	479	265	184	316
Butternut	78	171	183	0	106	0	0	84	91	162	0	0	0
Elm	9,971	4,456	4,201	8,167	8,799	9,192	8,959	12,064	11,303	14,150	18,329	14,900	22,504
Paper birch	4,054	1,444	3,486	3,933	5,879	4,426	5,750	5,594	4,150	4,914	1,486	4,082	634
Other hardwoods	4,069	4,255	4,801	1,282	4,284	4,039	6,652	847	647	14,185	1,029	6,182	0
Noncommercial species	879	1,676	1,578	234	391	554	927	115	1,003	950	1,737	824	612
Total hardwoods	102,327	38,332	53,153	79,708	104,363	111,046	122,594	112,016	133,146	133,184	150,621	143,087	126,329
Total all species	116,695	41,324	59,486	88,636	115,007	127,214	135,751	136,808	155,536	149,269	161,770	166,088	154,719
Number of plots	606	77	56	40	56	76	59	67	60	42	26	26	21
Standard error	11,957	14,059	21,868	30,840	38,162	37,722	44,242	43,757	46,127	51,177	68,450	71,211	71,699
Average basal area	75	29	43	60	73	81	83	88	97	93	99	105	99

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 38.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Maple-birch All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	2,314	386	2,302	1,621	2,021	1,265	2,116	2,806	2,807	3,013	5,076	1,943	5,062
Red pine	310	311	489	144	156	19	418	290	463	0	504	273	868
Jack pine	149	183	816	214	38	0	115	85	458	0	0	39	37
White spruce	457	93	569	370	529	415	435	606	462	422	748	560	438
Black spruce	124	44	129	29	92	206	62	257	261	0	0	245	0
Balsam fir	2,852	1,247	2,142	1,612	3,875	3,355	2,908	3,713	3,192	3,294	1,313	2,871	3,041
Hemlock	6,387	497	1,240	421	1,443	2,245	2,358	3,458	3,937	6,139	11,362	20,931	38,194
Tamarack	93	28	113	148	45	100	130	160	0	0	0	50	170
Northern white-cedar	1,131	208	337	200	234	614	840	1,429	785	1,145	1,822	2,870	4,213
Other softwoods	32	0	0	396	117	15	0	0	0	0	0	0	0
Total softwoods	13,849	2,997	8,137	5,155	8,550	8,234	9,382	12,804	12,365	14,013	20,825	29,782	52,023
Hardwoods													
Select white oak	2,332	1,813	3,171	2,271	3,042	1,404	2,269	1,728	3,043	3,398	3,599	3,005	1,931
Select red oak	8,668	3,254	4,432	7,215	8,448	8,862	11,056	9,151	9,678	13,325	11,272	8,937	7,190
Other red oak	992	800	2,466	2,571	915	430	1,339	611	1,098	135	1,223	406	585
Hickory	1,693	967	1,997	1,990	3,483	2,295	1,458	711	1,354	1,835	1,308	2,228	1,407
Yellow birch	6,817	827	2,670	1,952	4,802	4,711	4,808	7,421	7,227	10,389	14,039	13,055	19,149
Hard maple	50,593	13,258	12,422	19,364	34,795	49,807	55,842	63,263	71,547	70,288	72,189	66,980	77,471
Soft maple	20,111	9,232	14,962	18,364	22,742	27,572	25,144	24,591	17,674	18,911	18,556	17,265	7,953
Beech	972	90	815	2,677	149	151	205	689	526	1,195	809	3,521	3,556
Ash	7,529	2,563	1,832	6,331	7,107	9,529	9,045	10,361	11,287	8,975	6,494	6,983	4,010
Balsam poplar	113	13	0	0	584	89	204	35	202	75	234	0	0
Cottonwood	94	200	177	207	0	0	27	0	0	150	111	573	0
Bigtooth aspen	2,019	523	857	1,202	2,380	2,823	3,937	1,702	3,367	1,566	1,703	646	184
Quaking aspen	7,538	3,764	8,325	11,494	12,382	11,888	10,129	7,493	4,624	4,416	2,050	2,692	912
Basswood	14,711	2,195	3,803	9,372	12,009	20,537	18,817	22,256	16,572	17,563	13,833	11,636	10,652
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	111	0	0	332	204	5	253	39	273	81	0	172	0
Black cherry	2,384	1,521	3,364	3,423	3,601	3,038	2,509	1,718	3,832	1,729	1,501	1,662	415
Butternut	508	488	950	1,141	332	229	306	266	607	680	1,260	597	492
Elm	8,071	3,135	5,485	6,954	9,383	7,555	8,497	9,554	10,952	9,428	7,768	8,958	9,438
Paper birch	6,251	2,116	4,235	5,397	6,905	7,337	8,778	9,127	4,202	6,113	7,486	5,061	2,140
Other hardwoods	439	109	296	348	2,349	64	399	422	813	364	208	424	214
Noncommercial species	3,032	1,667	3,701	5,763	2,248	2,333	3,097	2,751	3,096	2,723	2,635	3,233	4,450
Total hardwoods	144,978	48,535	75,960	108,368	137,860	160,659	168,119	173,889	171,974	173,339	168,278	158,034	152,149
Total all species	158,827	51,532	84,097	113,523	146,410	168,893	177,501	186,693	184,339	187,352	189,103	187,816	204,172
Number of plots	1,887	156	130	111	113	281	313	234	116	112	73	117	131
Standard error	18,704	20,472	25,400	32,852	45,373	56,858	63,320	67,066	65,389	66,700	69,958	58,575	80,069
Average basal area	93	34	57	74	89	102	105	110	104	103	103	104	110

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

Table 39.--Biomass yields per acre in all live trees by species group[1/] and stand-age class, All Units, Wisconsin, 1983

Forest type - Aspen All sites

(In pounds per acre green weight)

Species group	Average[2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,246	608	524	545	916	1,096	2,337	3,161	4,274	8,103	0	0	0
Red pine	1,223	920	498	1,520	874	655	2,675	2,244	3,202	3,139	0	0	0
Jack pine	1,174	666	1,055	1,363	1,478	1,603	690	2,159	585	916	0	0	0
White spruce	849	380	435	938	918	1,027	1,322	1,014	1,052	2,914	0	0	0
Black spruce	351	300	419	405	179	353	606	317	0	0	0	0	0
Balsam fir	3,750	1,562	1,518	2,490	4,774	4,925	5,211	7,605	6,472	8,092	0	0	0
Hemlock	128	167	0	111	188	57	0	58	1,403	1,077	0	0	0
Tamarack	235	160	274	31	280	186	245	0	2,353	0	0	0	0
Northern white-cedar	486	183	116	184	349	397	1,309	835	3,194	243	0	0	0
Other softwoods	2	4	13	0	0	0	0	0	0	0	0	0	0
Total softwoods	9,444	4,950	4,852	7,587	9,956	10,299	14,395	17,393	22,535	24,484	0	0	0
Hardwoods													
Select white oak	1,606	862	1,007	1,207	2,378	1,915	1,614	2,953	2,541	1,523	10,404	0	0
Select red oak	4,946	1,425	1,915	2,706	3,880	6,708	9,649	12,365	4,175	15,472	51,558	0	0
Other red oak	2,266	1,524	917	1,777	1,735	3,134	3,323	1,016	9,896	2,447	27,077	0	0
Hickory	145	108	175	316	199	0	31	766	0	0	0	0	0
Yellow birch	467	147	79	329	348	697	846	1,298	682	1,091	0	0	0
Hard maple	2,830	1,206	992	2,853	2,488	3,780	4,113	6,813	5,122	4,913	0	0	0
Soft maple	10,652	4,848	5,403	6,768	11,053	15,837	16,380	16,417	9,900	22,505	0	0	0
Beech	25	2	0	0	0	115	0	0	0	90	0	0	0
Ash	1,579	700	1,028	1,274	2,421	1,872	2,101	2,460	2,021	27	0	0	0
Balsam poplar	748	208	214	274	706	739	1,776	1,772	1,177	4,737	0	0	0
Cottonwood	92	101	48	98	0	0	427	0	0	0	0	0	0
Bigtooth aspen	11,305	2,616	3,840	5,541	9,739	17,394	23,245	18,963	22,300	16,001	68,584	0	0
Quaking aspen	44,311	15,166	30,010	45,598	61,844	61,794	53,544	52,524	37,771	56,013	5,377	0	0
Basswood	980	214	1,130	476	967	1,440	1,480	1,935	263	389	0	0	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	1,323	814	816	1,551	1,899	1,994	994	786	1,901	0	0	0	0
Butternut	53	0	0	0	41	75	120	332	0	0	0	0	0
Elm	1,152	680	587	1,107	1,415	1,170	1,559	2,953	794	803	7,717	0	0
Paper birch	10,664	3,319	4,730	8,177	12,438	15,019	19,932	13,663	10,324	12,094	21,108	0	0
Other hardwoods	123	104	184	83	278	105	54	0	0	0	0	0	0
Noncommercial species	910	613	624	1,205	1,214	1,085	784	845	1,200	1,366	0	0	0
Total hardwoods	96,177	34,657	53,699	81,340	115,043	134,873	141,972	137,861	110,067	139,471	191,825	0	0
Total all species	105,621	39,607	58,551	88,927	124,999	145,172	156,367	155,254	132,602	163,955	191,825	0	0
Number of plots	1,608	322	223	156	229	337	209	77	35	18	2	0	0
Standard error	14,833	16,063	21,335	31,440	40,810	48,626	52,385	53,507	50,884	70,500	3/	0	0
Average basal area	68	29	43	60	79	92	97	98	83	100	100	0	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

Table 40.--Biomass yields per acre in all live trees by species group and stand-age class, All Units, Wisconsin, 1983 [1/]

Forest type - Paper birch All sites

(In pounds per acre green weight)

Species group	Average [2/]	Stand-age class (years) 0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	91-100	101-120	121+
Softwoods													
White pine	1,920	1,698	973	321	3,209	592	2,673	3,585	3,247	5,770	0	0	0
Red pine	1,782	1,197	236	1,245	771	810	1,555	5,035	10,819	0	0	0	0
Jack pine	377	0	0	262	714	670	477	0	0	0	0	0	0
White spruce	1,545	0	0	2,463	193	1,757	2,480	1,260	422	52,336	0	2,943	0
Black spruce	427	600	0	583	0	322	941	313	329	0	0	0	0
Balsam fir	6,857	1,034	2,643	3,856	3,563	8,930	7,991	12,855	6,713	0	31,268	3,860	0
Hemlock	725	0	0	316	864	57	445	2,127	2,179	0	49,365	0	0
Tamarack	576	470	1,633	679	166	141	799	408	2,473	0	0	0	0
Northern white-cedar	1,163	0	839	549	906	2,093	632	1,237	4,370	0	0	2,355	0
Other softwoods	11	0	0	0	0	46	0	0	0	0	0	0	0
Total softwoods	15,383	4,999	6,324	10,274	10,386	15,418	17,993	26,820	30,552	58,106	80,633	9,158	0
Hardwoods													
Select white oak	2,219	1,683	4,885	206	4,388	2,183	1,265	1,876	2,051	0	0	3,183	0
Select red oak	11,241	3,610	3,813	4,117	9,678	10,786	18,783	16,810	12,875	0	0	0	0
Other red oak	914	0	743	273	1,781	927	640	488	6,536	0	0	0	0
Hickory	734	298	267	1,232	2,549	1,043	0	0	0	0	0	0	0
Yellow birch	985	18	134	1,813	190	1,107	1,349	1,113	1,453	0	17,110	0	0
Hard maple	4,588	340	1,255	651	3,196	4,384	8,446	7,561	7,425	0	0	0	0
Soft maple	14,016	2,637	11,490	12,637	9,641	17,906	18,471	15,226	6,863	0	58,084	0	0
Beech	0	0	0	0	0	0	0	0	0	0	0	0	0
Ash	2,329	87	1,089	2,132	3,747	3,351	1,395	2,320	5,304	0	0	3,596	0
Balsam poplar	194	518	0	0	321	126	0	260	0	0	0	7,588	0
Cottonwood	26	0	0	288	0	0	0	0	0	0	0	0	0
Bigtooth aspen	4,332	229	2,149	3,223	4,214	3,599	6,611	5,049	14,916	0	0	0	0
Quaking aspen	14,079	5,472	5,701	14,949	13,173	18,240	16,715	14,305	11,482	5,461	6,235	8,580	0
Basswood	1,107	0	640	1,280	1,192	1,221	1,936	384	0	0	0	5,772	0
Yellow-poplar	0	0	0	0	0	0	0	0	0	0	0	0	0
Black walnut	0	0	0	0	0	0	0	0	0	0	0	0	0
Black cherry	790	857	769	236	470	1,272	728	752	713	0	0	0	0
Butternut	35	0	0	0	280	0	0	0	0	0	0	0	0
Elm	1,275	1,231	951	1,323	2,893	1,550	379	636	2,606	0	0	0	0
Paper birch	69,896	20,448	40,223	51,862	77,457	79,598	78,594	92,911	78,249	13,985	135,987	52,540	0
Other hardwoods	131	235	0	370	292	0	83	0	848	0	0	0	0
Noncommercial species	1,260	321	438	631	2,393	1,971	188	2,200	1,638	0	0	0	0
Total hardwoods	130,151	37,984	74,547	97,223	137,855	149,264	155,583	161,891	152,959	19,446	217,416	81,259	0
Total all species	145,534	42,983	80,871	107,497	148,241	164,682	173,576	188,711	183,511	77,552	298,049	90,417	0
Number of plots	322	27	26	29	41	78	68	40	9	1	1	2	0
Standard error	24,599	19,724	30,327	43,364	48,582	64,012	62,070	92,766	89,186	3/	3/	3/	0
Average basal area	88	28	54	69	87	100	103	113	110	56	155	57	0

1/ Forest type definitions and species list are in the appendix.

2/ Weighted average over all stand-age classes--the average volume per acre for all plots in the forest type and index range.

3/ Insufficient number of plots to compute the standard error.

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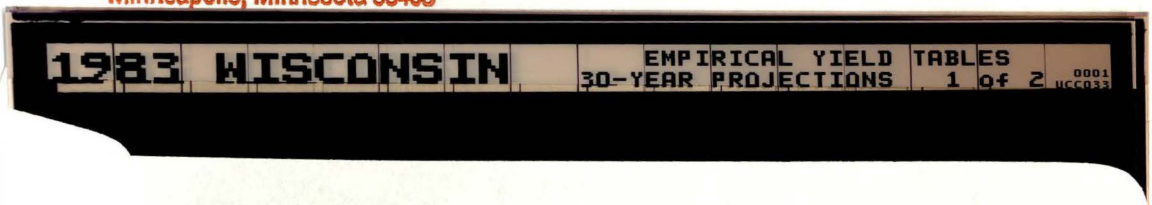

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Hahn, Jerold T.; Stelman, Joan M.
1989. **Empirical yield tables for Wisconsin.** Gen. Tech. Rep. NC-131. St. Paul, MN: U.S. Department of Agriculture, Forest Service, North Central Forest Experiment Station. 46 p.

Describes the tables derived from the 1983 Forest Survey of Wisconsin and presents ways the tables can be used. These tables are broken down according to Wisconsin's five Forest Survey Units and 14 forest types.

KEY WORDS: Inventory, volume, growth.